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MAY 1929 35 CENTS

AERO DIGEST

AERIAL RADIOPHONE **ALTITUDE FLIGHTS** **SEAPLANE HANDLING**

MIAMI-PANAMA AIR MAIL—By James Warner Bellah

The giant steel skeleton of a ship

FOR every bolt and rivet that goes into the framework of a ship, a hole must be cut through hard, unyielding steel.

In the world's great ship yards, big husky W & B drills are standing staunchly up to their work—proving that rugged quality of endurance that has made them famous through the years.

In this spectacular era, when speed is a fetish, when competition faces low costs, when manufacturing accuracy is essential—industry pays particular attention to its tools.

There is a very real advantage in turning for drills, reamers and cutters to an organization that has specialized in the design and manufacture of cutting tools for more than three quarters of a century.

W&B

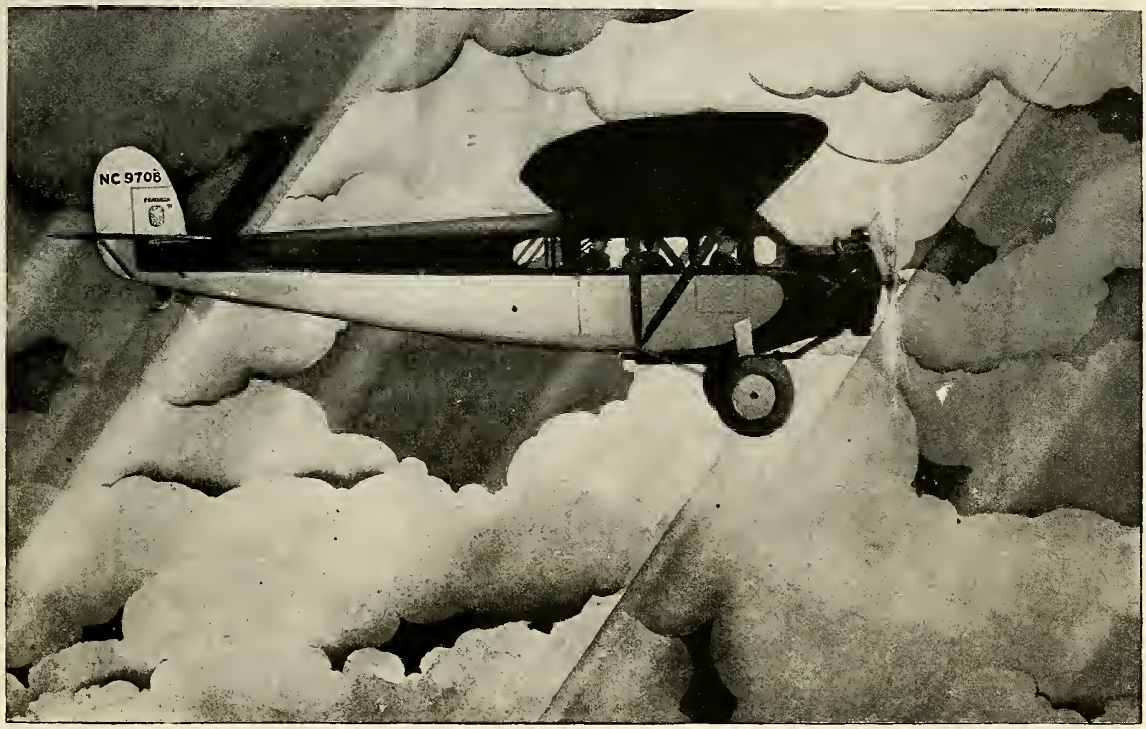
WHITMAN & BARNES
DETROIT, MICH.

Canadian Factory: Canadian-Detroit Twist Drill Co., Limited, Walkerville, Ont.
TOOL MAKERS FOR 78 YEARS

AERO DIGEST, May, 1929 *Published by the Aeronautical Digest Publishing Corporation, at 220 West 42nd Street, New York, N. Y. Entered as second class matter July 17, 1922, at the Post Office, New York, N. Y., under the Act of March 3, 1879*

Highest in Performance

lowest in cost per flight mile



MORE Fairchild "Wasp" engined planes are flying today in transport and other commercial services than any other single-engined cabin unit. From Hudson Bay to the Bay of Whales, the experience of hundreds of pilots has built such a demand that today more Fairchild "71s" are coming off the production line than any other comparable plane.

Fairchild performance, flying qualities, reliability and comfort are *known* quantities, tried and proven in over a million and a half miles of strenuous flying. When the "71" went into production, we *knew* that its specifications were *right* in every detail.

The "71" is a production job, built, as all Fairchild ships are built, to a 7½ to 1 safety factor. Because all parts are standardized and interchangeable, including wing and tail surfaces, service is rapid, accurate, and economical.

The "71" has a larger passenger and cargo capacity than any other single-engined ship of equal speed. At $18,900 flyaway Farmingdale, it has a demonstrated yield per dollar of investment which is definitely *higher* than any other ship now offered to the public. Write or wire Fairchild Airplane Manufacturing Corporation, Farmingdale, L. I., New York.

* * *

THE FAIRCHILD "71" *seven-place cabin monoplane for transport, mail, and commercial uses. A larger passenger and cargo capacity (145 cu. ft.) than any other "Wasp" engined plane of its speed. Folding wings. Floats or skis installed in a few hours. Fine interior finish. Soundproofing. Heater. Disposable load 2500 lbs. High speed 138 m.p.h. Cruising range 750 miles at 110 m.p.h.*

FAIRCHILD

AIRPLANES

Learn FLYING from the flying school book

It's NEW

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Partial List Table of Contents

CHAPTER ONE—Airfoils, Lift and Drag
Airfoils; flat plate and curved plate—Cambered Airfoils—Airfoils for different purposes; high lift, general purpose, high speed—Drag—Head Resistance—Streamlining—Fairing—Wind Pressure at various velocities.

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CHAPTER NINE—Pilot Licenses—The First Lesson
How to Become a Pilot—Inspection—Taxiing—Taking-off—Climbing—Flying Level—Turns and Banks—Landing.

CONCLUSION—Terminology.

Roth-Downs Airways, Inc.
Saint Paul, Minnesota

Here are the names of a few of the Flying Schools using "The Modern Airplane" as an elementary textbook:

Short's School of Aviation, Los Angeles
Eastern High School, Washington, D. C.
Kari-Keen School of Aviation, Sioux City, Ia.
Santa Maria Air Lines, Santa Maria, Cal.
Rapid Air Lines, New Orleans, La.
Meyers Airplane Co., Winnipeg, Canada
Graham Air Service, Bellingham, Wash.
Mid-Plane Transit, Minneapolis, Minn.
Air Service, Inc., Minneapolis, Minn.
Smith Brothers, Rome, N. Y.
Sunshine City Flying School, St. Petersburg, Fla.
L. & H. Aircraft Corp., Hartford, Conn.
Danbury Flying Club, Danbury, Conn.
Solden Aeronautics Schools, St. Louis, Mo.
R. W. Lutz Aircraft, Oskhosh, Wis.
Wellesly Aero Club, Wellesly, Mass.
Bernard Air Lines, Inc., Youngstown, O.
DeLotty Flying School, San Francisco, Cal.
Lincoln Airplane School, Lincoln, Neb.
McMullen Aircraft Co., Tampa, Fla.

A typical letter received from the Pittsburgh School of Aviation:

> "Your book 'The Modern Airplane' was chosen by the faculty of this school for a text book from a representative collection of books regardless of their price. We highly recommend this book to anyone interested in aviation."
>
> R. V. TRADER, Manager
> Pittsburgh School of Aviation.

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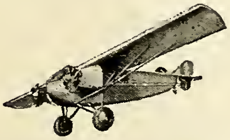
American Eagle planes are powered with motors from 40 to 225 h. p., and are priced from $1,895 to $18,895. Illustration shows the new Kinner powered biplane ($4,595) manufactured under approved Type Certificate No. 124.

American Eagle 49 Brougham, the 4-place cabin monoplane.



American Eagle 69 Sedan, the two-motored cabin monoplane.

American Eagle 29 Flyabout, the 2-place sport biplane with folding wings.

Behind every American Eagle airplane is American Eagle's brilliant record for structural stability, unfaltering performance, and faithful service. That's why the American Eagle has become more popular than any other plane in its class. Its reputation for *sheer quality* has spread across the world!

Because of this the American Eagle is a *salable product.* That fact alone makes the American Eagle franchise the most valuable sales contract in the industry today. But this franchise offers many other advantages, as well. A liberal scale of discounts. Immediate delivery of orders. A complete line of models—including a plane for every purse and purpose. And most important of all: the cooperation of a well-known and powerful concern—the first in the industry to maintain a road organization constantly at the service of its sales agencies.

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100 HORSEPOWER

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"WHAT did I tell you, Bill? That bird with -TP- will make it. The other fellow—not so good. I can't see why anyone wants to take a chance on a cheap oil when he knows for sure that -TP- will deliver."

-TP- Aero Motor Lubricating Oils are new—the latest development in scientific lubrication. They have been tested and approved by leading manufacturers of airplane engines and by many leading pilots. They are straight-run oils, not blended or compounded, produced from pure, paraffine-base crude by a process for which patents are pending.

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Texas Pacific Coal and Oil Company, Fort Worth, Texas Aero Digest 5-29.

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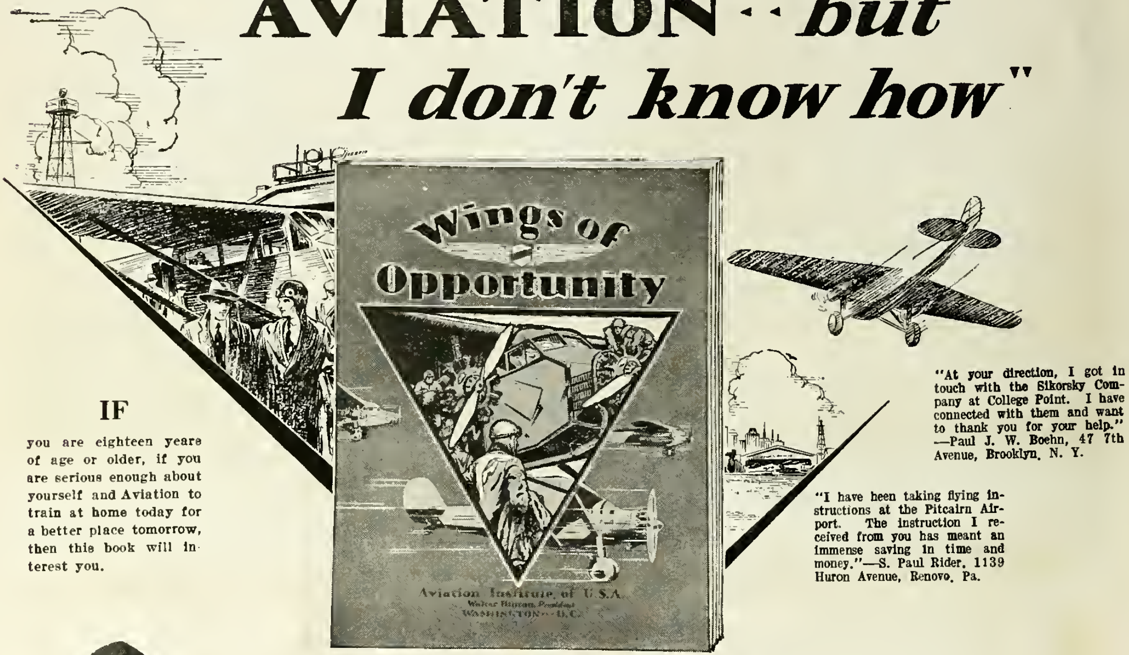
This Free Book .. is for the Man who says:

"I'd like to get into AVIATION .. *but I don't know how*"


Wings of Opportunity
Aviation Institute of U.S.A.
Walter Hinton, President
WASHINGTON, D.C.

IF

you are eighteen years of age or older, if you are serious enough about yourself and Aviation to train at home today for a better place tomorrow, then this book will interest you.

"At your direction, I got in touch with the Sikorsky Company at College Point. I have connected with them and want to thank you for your help." —Paul J. W. Boehn, 47 7th Avenue, Brooklyn, N. Y.

"I have been taking flying instructions at the Pitcairn Airport. The instruction I received from you has meant an immense saving in time and money."—S. Paul Rider, 1139 Huron Avenue, Renovo, Pa.

Walter Hinton

was pilot of the famous NC-4, the very first plane to fly the Atlantic; he was the first Aviator to fly from North to South America; he was first to use a plane for exploration. During the war he was one of the Navy's crack flying instructors. Over 400,000 miles of flight under every conceivable condition, and over thirteen years of intensive aeronautical experience are behind his method of training.

TO some men Aviation means spirals, banks, loops, a rush of wings, a roar of motors, a challenge to red-blood.

To others it means booming factories, busy air ports, expanding commerce, mounting sales, a challenge to ambition.

It does not matter WHY you are interested in Aviation—whether you think of it in terms of action in the air or action on the ground. It offers you an immediate opportunity and a big future. And Walter Hinton can help you realize both.

What is Walter Hinton's proposition? . . . It is three-fold:

First, Hinton puts you through a thorough course of training right at home, which completely covers Aviation's "ground-work." Flyers must have more than nerve and enthusiasm. Specialists in factories and at air ports need more than determination and energy. *Everybody,* in *every* branch of Aviation, needs *training.*

Second, Hinton backs up his course of study with a personalized, man-to-man service. He gives you special coaching on the subjects that are of particular interest to you.

Third, he helps you capitalize your training. If you want to fly, he directs you to a properly qualified flying school, and arranges for a reduction in your tuition. If you want a job, he puts you in touch with a prospective employer.

If your present occupation is not what you would like it to be—if the future possibilities of your job fail to measure up to the future possibilities within yourself—if you are EIGHTEEN years of age or older—then Hinton wants to present YOU with a copy of his book, "Wings of Opportunity."

The cost of Hinton's course and service is small. The return in dollars and opportunity—is practically unlimited. What Aviation wants today above everything else is men with the *right kind* of training. Aviation will want YOU once you have *that.*

Aviation Institute of U. S. A.

WALTER HINTON, President
1115 Connecticut Avenue, Washington, D. C.

Send to Washington

Aviation Institute of U. S. A., Walter Hinton, Pres. 102-T
1115 Connecticut Avenue, Washington, D. C.

Kindly send me a FREE copy of your book, "Wings of Opportunity." I would like to get into Aviation.

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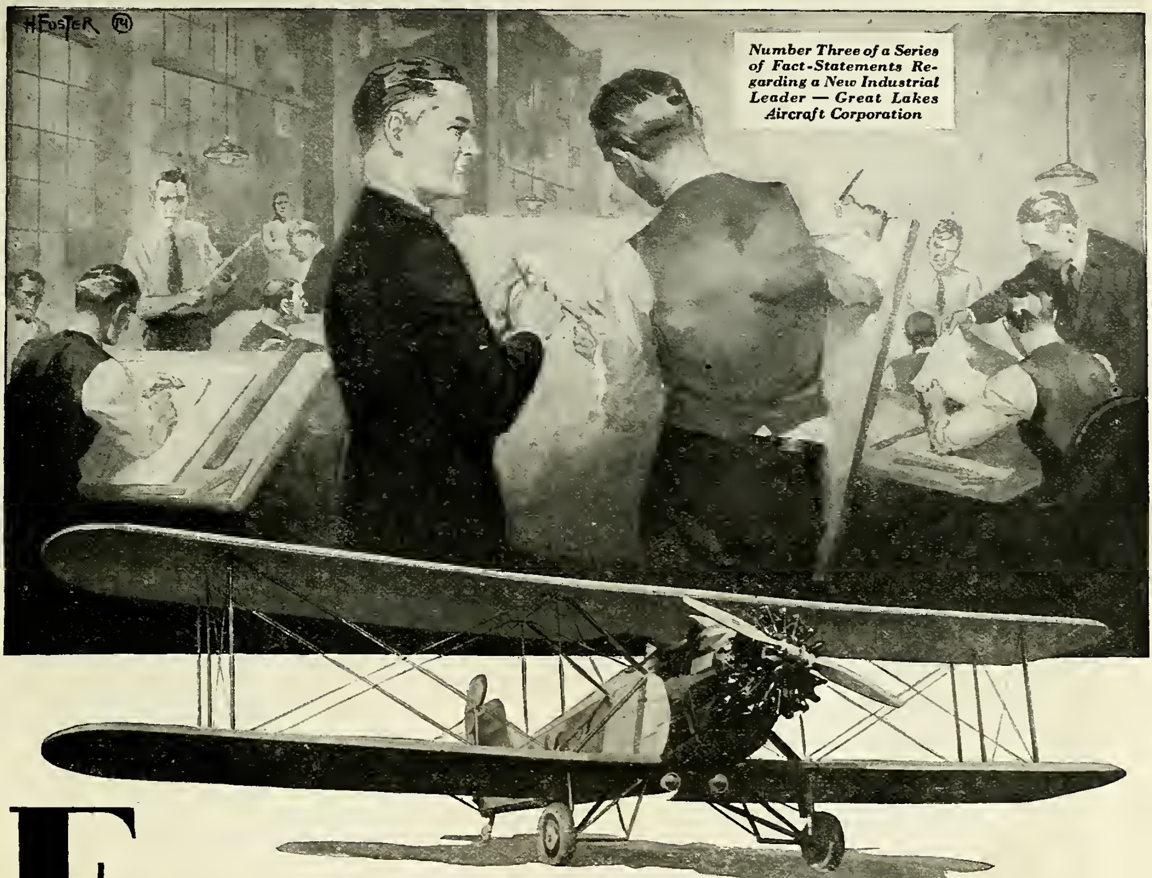
(Must be 18 or over)

Street ....

City .... *State* ....

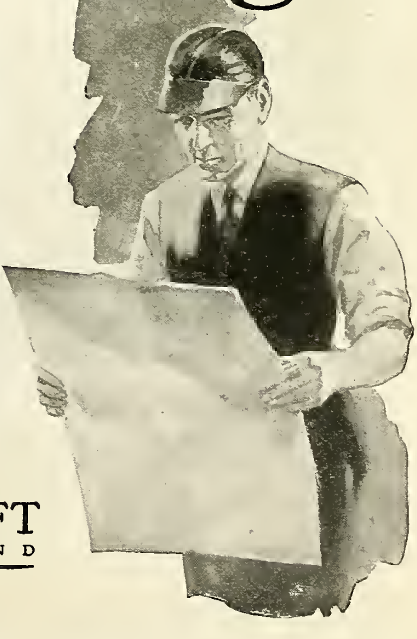


Number Three of a Series of Fact-Statements Regarding a New Industrial Leader — Great Lakes Aircraft Corporation

Engineering

IN the fast-fading days of small production in the aircraft industry, successful concerns have been built around the engineering ability of a single designer. The day is already here, however, when individual effort, be it ever so brilliant, must yield to superior force of numbers—when the one-man engineering department must be replaced by a group of trained specialists working in harmony toward a common end.

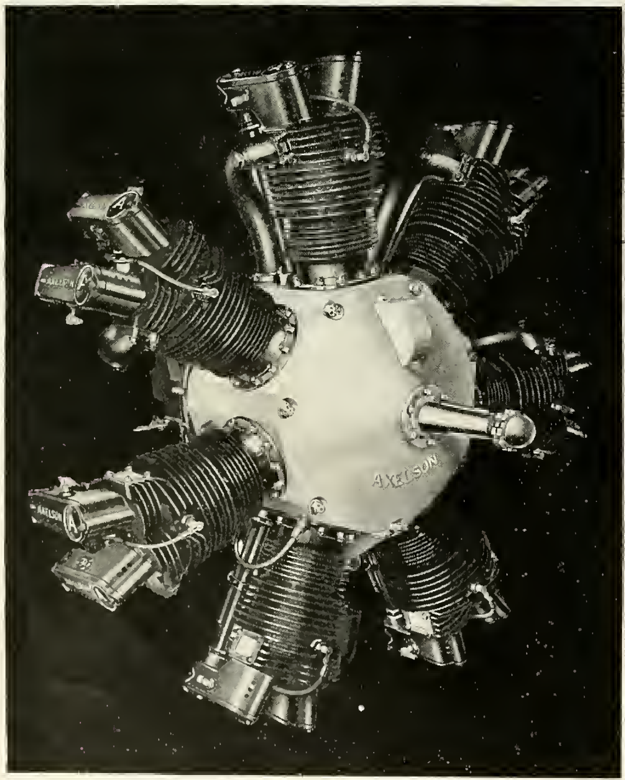
Great Lakes aircraft design, consistent with this Corporation's broad view of the commercial aviation field, owes its superiority to the coordination of such an engineering group. Great Lakes engineering problems have the benefit, not of one designer, but of many. Not of a few years of experience, but of close to a hundred. Designs of proven merit evolve easily and naturally from this wealth of experience and ability. Wings, fuselage, empennage, undercarriage, floats, power plant—each separate element of the projected whole has the undivided attention of a specialist in that particular phase of aero engineering. The results, spelled out in terms of quality and performance, are daily writing new pages in aviation history.



GREAT LAKES AIRCRAFT
CORPORATION CLEVELAND

Engines

that reflect Accuracy in its highest POWER



UPPERMOST in the mind of the pilot is the trustworthiness of his engine—for a ship is no better than its engine. And in turn, an engine is no better than the degree of *accuracy* with which each part is manufactured.

Axelson Airplane Engines are the prodnct of 37 years' experience, focused in one organization, engaged in the art of fine tool making and precision mechanical manufacture.

During these 37 years Axelson has produced many millions of dollars' worth of fine tools and mechanical products, such as heavy-duty precision lathes, gauges, finely finished oil well pumps, and other works requiring a knowledge of the most advanced methods of metal analyses, heating treatment, precision measurements and testing.

It was but a logical step for Axelson to dedicate this ripened experience and success to the development of airplane engines that would dominate in quality and character equally as much as do Axelson Lathes and oil field equipment in their respective fields.

As a result of years of research and study, supported by the broad and successful experience of the organization, a 7-cylinder static, radial, air-cooled engine is offered. It is unquestionably the outstanding achievement in engine design, simplest in construction, developing the highest horse-power of any engine of similar size, and embodying several exclusive features, particularly in its method of lubrication.

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The new Boeing 95s which cruise 20 M. P. H. faster than the original ships in service on Boeing's Chicago-San Francisco end of the transcontinental airmail route are helping speed up the entire network of the nation's airmail. . . . .

Phillips congratulates Boeing on this achievement and is pleased with their selection of Phillips Aviation gasoline—the light weight fuel that affords even distribution to all cylinders and more efficient, economical operation. . . . .

The Boeing System carries 30% of the nation's air mail and flies 7,000 to 10,000 miles daily.

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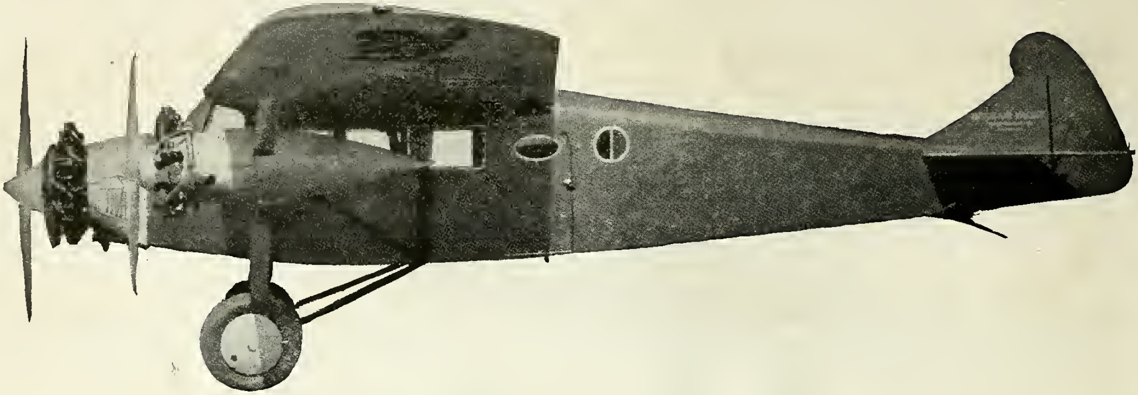

Why pay for more than you need?

THE Bach Ten Place Tri-motor Transport carries comfortably and in utmost safety, eight passengers, their luggage and two pilots, at speeds ranging from 50 to 150 miles per hour. Because of this and its *long life and total operating cost of only 50 cents per mile* the Bach deserves the airline operator's first consideration when purchasing new equipment.

There are *many* instances and uses for which a larger and more costly plane is unnecessary; yet many operators are buying such equipment and are carrying the *needlessly* high insurance, depreciation and operating costs. So for the sake of profitable operation and sound investment . . . . . why pay for more than you need?

BACH AIRCRAFT COMPANY, INC.

Los Angeles Metropolitan Airport
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Service . . . for CHICAGO

Air Associates, Inc., will establish a complete Field Service at Chicago Municipal Airport that will be fully worthy of America's largest center of air transport traffic . . . .

THE East has long known the excellence of "A. A." Service—maintenance, technical and supply. The Midwest is now to be served by Air Associates in a branch located at Municipal Airport, Chicago. So that the recognized need for a high calibre service in the territory may be met fully, provision for the following has been made:

BUILDING—The service station will be housed in a handsome two-story building, that will be second to none in the country, in point of equipment and facilities. It will have a 200-foot frontage on 63rd Street and a depth of 160 feet, with hangar entrance on the field. It will contain: offices, stores, stockroom, airplane storage space, paint room, oil room, wood-working room and welding room, machine shop, locker and shower room, observation room and Field Inspector's or other official's office. Fire sprinkler system throughout.

STAFF—There will be a permanent personnel of over thirty employees, including branch manager, sales manager, service superintendent, aircraft repair foreman, machine shop foreman, floor foreman.

WRIGHT SERVICE—The branch will be the authorized service station in Chicago for the Wright Aeronautical Corporation, for parts and repairs of WRIGHT engines.

FIELD SERVICE—Complete organization and equipment for the handling, storage, maintenance and repair of aircraft and engines; gas truck and fueling service; linemen; washing service.

TECHNICAL SERVICE—Competent technical service will be available with adequate laboratory equipment; compass rose and instrument compensation service.

SUPPLY SERVICE—A stock of supplies and equipment will be carried on hand, complete to the last detail. Hundreds of items will be listed, described and priced in the Air Associates' Catalog now on the press.

The foregoing suggests the completeness with which Air Associates plan to serve owners and operators of aircraft at Chicago. The service will lack nothing to make it the finest of the kind at any airport. The entire resources of the Air Associates organization are pledged to that end and its reputation for accomplishment is a guarantee of its ability to carry through the Chicago program to the last detail, as planned.

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from NEW YORK *to* MIAMI-HOUSTON

Naturaline functions just as uniformly in the North as it does in the South, *climate makes no difference.*

PITCAIRN AVIATION, INC.

Mr. James G. Ray of Pitcairn Aviation, Inc., wrote to us in appreciation of Naturaline, as follows:

"We have been using Naturaline on our New York-Atlanta Airmail line for several months and find it very satisfactory. We find that our motors run considerably smoother than they did on domestic aviation gasoline and that they develop about 25 to 50 more revolutions. Also our consumption is running less per hour—your distribution has made it possible for us to procure Naturaline at a very reasonable price."

Pilots flying these mail routes can always depend on securing Naturaline at these mail stations.

GULF AIRLINES, INC.

Mr. Wm. H. DeWald of the Gulf Air Lines wrote to us in appreciation of Naturaline, as follows:

"We have found that our motors run much smoother on Naturaline than on the regular domestic aviation grade of fuel and also that they run cooler which is a very important factor in this warm country. These features, coupled with the fact that it weighs one-half pound per gallon less than specification gasolines influenced us to adopt Naturaline for use on our lines and our experience with it to date has been very satisfactory from every standpoint."

Naturaline starts a cold motor quickly.

Naturaline is a perfectly balanced fuel.

Naturaline is uniform at all times.

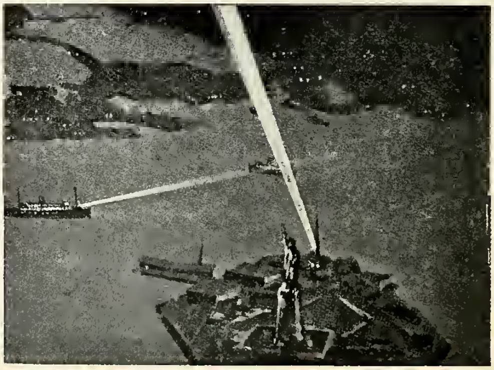
Naturaline weighs ½-lb. per gallon less than ordinary domestic aviation gasoline.

Naturaline will increase the R. P. M. from 25-50 depending upon type of motor.

Naturaline saves in fuel consumption from 5-15% depending upon type of motor.

Naturaline has an anti-knock value equivalent to 48% pure benzol.

Naturaline will reduce motor overhaul costs.



NATURALINE

NATURALINE
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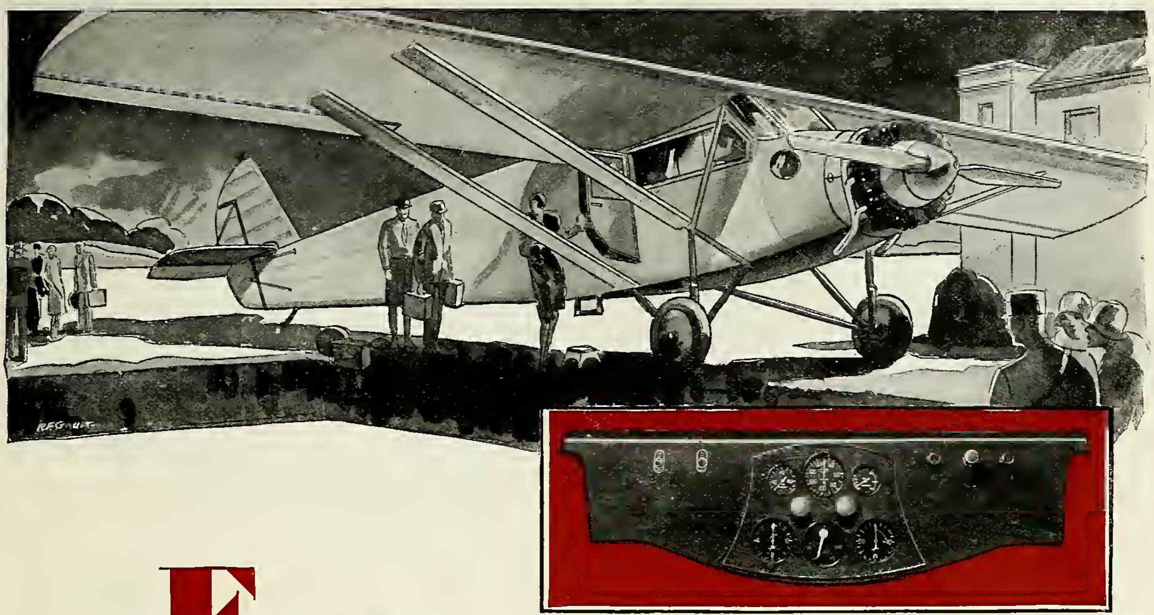
Tulsa, Oklahoma



For The New Mode in Air Travel

Swift strides in recent years have carried the aviation industry rapidly forward to its present state of ever-increasing large scale production. And with equal swiftness have the attractiveness and comfort of the modern airplane transformed air travel into a pleasing as well as safe means of passenger transportation.

The custom design of the specially constructed Consolidated instrument panel shown above typifies this new mode in aircraft construction. Instrument efficiency and decorativeness now go hand in hand.

The metal surface of this custom panel, which a prominent manufacturer has chosen as standard equipment, is skillfully grained in a deep, warm brown to represent a rich walnut finish. Indirectly lighted and with circular dials of unusual visibility, this graceful panel affords the pilot a maximum of instrument assistance in guiding his plane to port. The center bezel containing the instruments can be removed without taking the entire panel out so that adjustments can be easily made.

Aircraft manufacturers, designers, and individual owners are invited to write for details of our custom-built panel service.

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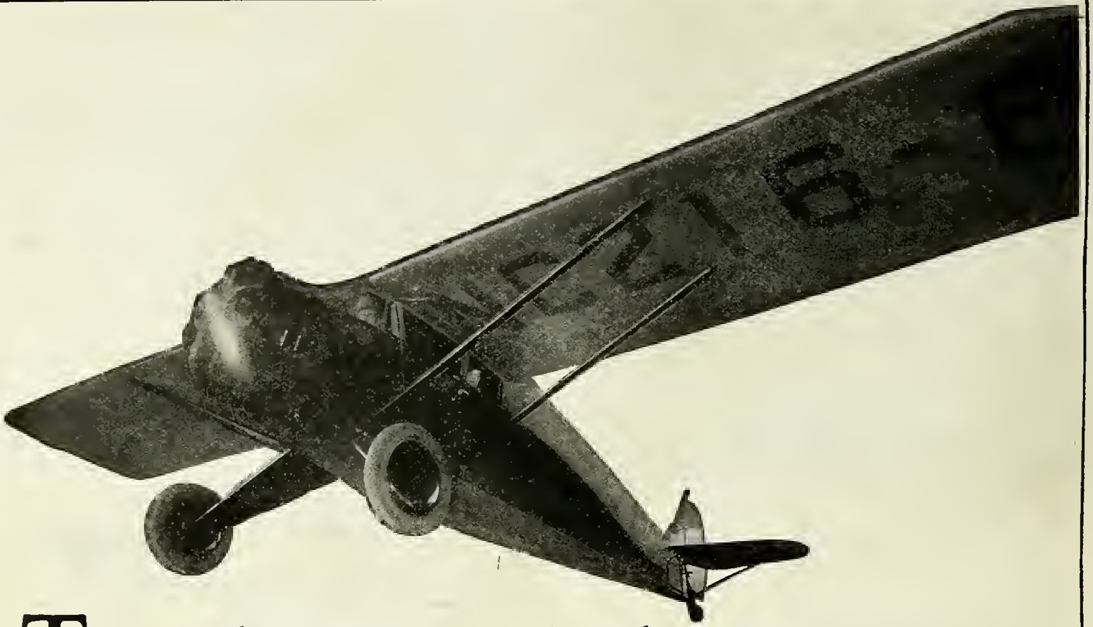

Tear the cover off The Aristocrat!

You can "tear the cover off" the Aristocrat, examine every detail of construction, and convince yourself that it is a carefully worked-out masterpiece, not just merely built.

* * *

You will discover that it embodies all the improvements and refinements of advanced design. You will observe that only the very best of materials and workmanship are employed in its construction.

* * *

After looking "under the cover" you will more fully appreciate why it is the safest, finest and best performing small cabin airplane in the world.

* * *

You must see the Aristocrat, fly it, or fly in it to fully comprehend its superior qualities. Famous pilots, aeronautical engineers, mechanics, dealers and owner-flyers who understand airplanes unanimously agree with Lieutenant Bernt Balchen, Chief Pilot of the Byrd Antarctic Expedition, who said: *"It is the finest plane of its type I have ever seen."*

* * *

You will find the Aristocrat sets a new standard for beauty of lines and finish, and for all-around stability, maneuverability, comfort and safety. It affords exceptional visibility for pilot and passengers; roominess and luxurious fittings equal to the finest automobile.

A Complete Line

General Airplanes Corporation manufactures a complete line of commercial airplanes of advanced design, all conforming to the specifications of U. S. Army, Navy, and Department of Commerce, as well as the I. C. A. N.

* * *

Get your airplane franchise NOW. Territory is going fast. Perhaps yours is still open! Wire or write for our liberal Moneymaking Offer to dealers.

The Aristocrat will take off quicker in "dead" summer air and land in a smaller area than any other airplane of its type or class.

* * *

It has ample reserve power, plenty of "pep", and above all safety of performance in that it will not go into an involuntary tail-spin.

* * *

The Aristocrat is built by an operating personnel which contains the ablest engineers and manufacturing executives in the airplane industry. The average length of aeronautical experience of these men is more than twelve years.

* * *

The Aristocrat will remain the outstanding three-place cabin monoplane for some time to come. *It must and will command your attention. Make us prove it!*

GENERAL AIRPLANES CORPORATION, 553 *Abbott Road, Buffalo, N. Y.*

IN every flyer's mind there is a horror of soft spots on the ground and care must be taken to see that the landing field is thoroughly drained. * * *

—(*From an article by P. N. Pynchon in* FIELD ILLUSTRATED)

Soft spots are wet spots—dry fields stand firm to resist wheel pressure

Soft spots disappear *when* fields are drained *with Flexible Pipe*

ENGINEERS and airport officials have found that Armco Perforated Iron Pipe provides continuous and dependable drainage that keeps airports dry. This flexible drain pipe absorbs shocks and impact from gasoline trucks, ground equipment and landing and departing planes. It cannot be crushed, nor can it disjoin from shifting or settling of soil. Write today for further information on *safe* airport drainage.

ARMCO

Armco culverts and drains are manufactured from the Armco Ingot Iron of the American Rolling Mill Company and always bear its brand.

ARMCO CULVERT MANUFACTURERS ASSOCIATION
MIDDLETOWN, OHIO

ARMCO *perforated* PIPE

USE *flexible* PIPE — IT CANNOT BREAK

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To be sure of your plane be sure of your spark plugs

AC has developed three successful types of metric spark plugs which are especially designed and built for aircraft engines.

AC TYPE "N": Known as our Metric Aircraft Regular, is recommended for air cooled engines operating at cruising speeds, or where consistent fouling is experienced with type "NN-1" or pre-ignition with type "N-1."

AC TYPE "N-1": Known as our Metric Semi-Aircraft (Modified Aircraft), is recommended for water cooled engines, or in air cooled engines where fouling is experienced with type "N."

AC TYPE "NN-1": Known as our Metric Aircraft Short, is recommended for air cooled engines operating at full throttle over long distances, or where pre-ignition is experienced with type "N."

The AC Spark Plugs of today are designed and built for today's engines. Their record in aviation stands absolutely alone. They have been used successfully in most of the world's longest endurance flights.

AC Spark Plug Company
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Birmingham
ENGLAND

AC-TITAN
Clichy (Seine)
FRANCE

AC SPARK PLUGS AC SPEEDOMETERS AC AIR CLEANERS AC OIL FILTERS AC FUEL PUMPS
AC GASOLINE STRAINERS AC AMMETERS AC OIL GAUGES AC THERMO GAUGES

© 1929, AC Spark Plug Co.

ROBERTSON

has been an authority on hangars since war days . . . . .

In

AMERICA
•
ENGLAND
•
SPAIN
•
INDIA
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EGYPT
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GREECE
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CHILE
•
HAWAII·PANAMA
PHILIPPINES etc.

WE PLACE at your command one of the world's most complete funds of knowledge about hangars and their construction.

Robertson engineers have been taking part in hangar construction since the beginnings of modern commercial aviation. They have been all over the world, learning invaluable lessons, witnessing and often participating in most of the notable experiments that have been made in methods of building and equipping hangars. They know, from actual experience, the things that will work, and the things that won't.

Such knowledge and experience in a field where there is still so much guess work and inexperience is invaluable.

These engineers have been able to apply to hangars a material that is much less costly than heavy construction... yet which will last three or four times as well as materials like unprotected metal. They have worked out definite methods for daylighting hangars so that even delicate motor repairs can be done efficiently indoors. They have established systems of ventilation that remove poisonous exhaust gases from hangars.

As a result of this knowledge, Robertson has become headquarters for hangar information. We are glad to have you consult Robertson engineers about any problem your airport may present. It will cost nothing and will not obligate you.

H. H. ROBERTSON CO., PITTSBURGH

Second largest airshed in the world—at Cardington, England. Robertson Protected Metal (RPM) used on the roof of this hangar. RPM used also on the airshed which is the largest in the world.

ROBERTSON

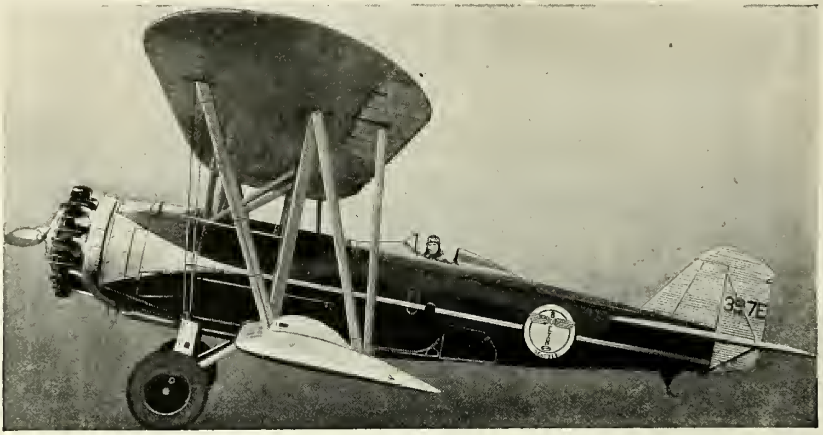
WORLD RPM WIDE
BUILDING SERVICE

Send for this Booklet on Hangars

The Robertson engineers have prepared a booklet which gives the reasons for and against various building materials, general information regarding justifiable costs, and illustrations of many types of hangars. It is a clear statement of the world's last 12 years of experience with hangars. It will be of great value to anyone planning a hangar. It will be sent without charge.

ROBERTSON

Has the Experience



Boeing Mail-Cargo Plane (Model 95)

National Air Transport, Western Air Express *and* Robertson Aircraft —buy *Boeing Planes*

SPECIFICATIONS: (Model 95)

Approved Type Certificate No. 106
Engine—Pratt & Whitney "Hornet," 525 hp.

PERFORMANCE
(With 1,610 Pounds Pay Load)

High Speed (Propeller Setting, 16°)	140 mph
High Speed Propeller Setting, 17°)	142 mph
Landing Speed	56 mph
Rate of Climb (ft. per minute)	950 feet
Climb in 10 minutes	7,350 feet
Time to 10,000 feet	15.4 minutes
Service Ceiling	16,000 feet
Take-off Run	540 feet
Take-off Time	11.6 seconds
Wing Loading	11.9 lbs/sq ft
Power Loading	11.1 lbs/hp

DIMENSIONS

Span	44 feet 3 inches
Length overall	31 feet 11 inches
Height overall	12 feet 1 inch

WEIGHTS

Empty	3,196 pounds
Pilot	170 pounds
Fuel (130 gallons)	767 pounds
Oil (12.5 gallons)	97 pounds
Actual Pay Load	1,610 pounds
Gross Weight Loaded	5,840 pounds

Boeing Airplane Company

(Division of United Aircraft and Transport Corporation)

Seattle, Washington

SIXTY days ago the Boeing Airplane Company announced it had mail planes for sale. It said the new Boeing Model 95 is the fastest, heavy payload, most economical, single engine mail-cargo plane made.

Within the last month Boeing mail planes have been delivered to National Air Transport, Western Air Express and Robertson Aircraft Corporation. *These pioneer air companies, with a total of millions of miles of flying behind them, had the airplane field to choose from when purchasing new equipment.*

Model 95 is the plane that "3 1/3 *million miles of flying developed.*" It is adapted for any route in the country because the Boeing System had to build a plane for its own use which would operate equally well at sea level or 12,000 feet, at sub-zero or tropical temperatures. A plane Boeing System can use on its routes must have speed, heavy payload (1,610 pounds), quick take-off, low landing speed and economical operation. It must minimize night flying difficulties, have rapid servicing features, and be so planned as to obtain maximum loading of the payload.

National Air Transport, Western Air Express and Robertson Aircraft Corporation recognized the advantages Boeing equipment offers to operators seeking carriers with outstanding performance—dependable, economical, revenue producing—"on the job every day."

Due to superior performance over any other large capacity, high speed carriers, Boeing mail planes are now used on five of the pioneer air mail routes in the country—a merited indorsement.

Model 95 is offered for immediate delivery.
Models 40B and C—mail and passenger—and Model 204
—flying boat with six seats—offered for
ninety day delivery.

Big Business Stands Begging
For Trained Flyers

The most magnificent opportunity for advancement the world has ever known—that's what aviation offers the young man who enters this fascinating new combination of game and work. Aviation is a young man's industry. It's infused with the spirit of youth, of soaring progress. It's heathful, pleasant, full of the spirit of romance. It's profitable far beyond the dreams of the young man whose business career is just dawning.

Parks Air College, the largest air school in the United States, leads all others, not only in enrollment, but in the number of its graduates, the thoroughness and meticulous accuracy of its training, and the completeness of its flying and ground equipment.

Parks Graduates Are In Demand

And no wonder. They are finished and dependable flyers and the aeronautical industry recognizes them as such. They are in a class far above that of the average young flying school graduate who offers himself to an industry that quickly discriminates—that will tolerate the pilot only when he proves his claims of excellence at the controls of an airplane. Parks Air College will graduate no flyer until he is entirely worthy of the trust that is to be placed in him as an airman. In our class rooms you will follow a regular curriculum, laid out as carefully as the courses of a University. And in the air you will be taught flying by the established and reliable *Parks* method.

The system that has turned out hundreds of other competent flyers will graduate you too. It is this system of carefully coordinated instruction that has made Parks Air College the undisputed leader.

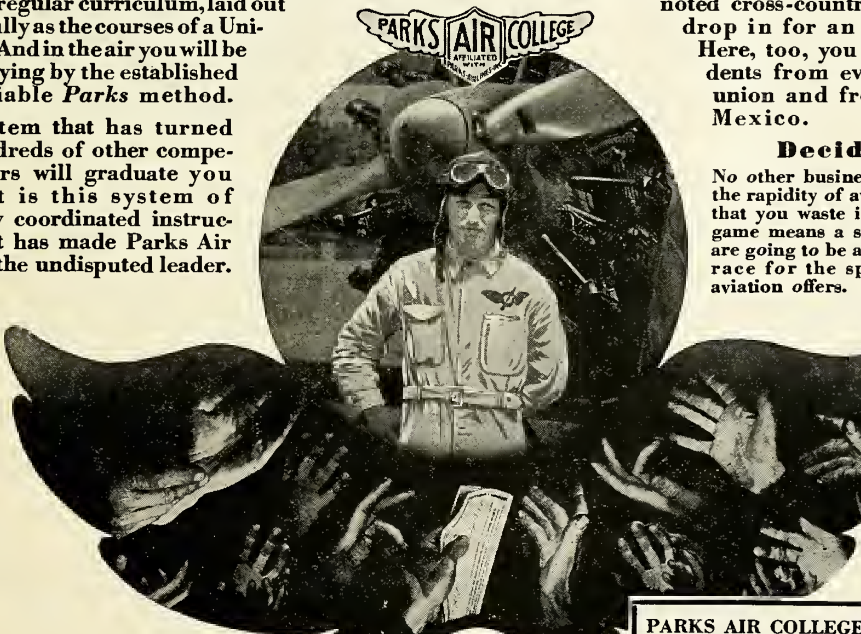
Parks Graduates Are Expertly Finished

At Parks you will have the most up-to-date equipment that can be bought. A fleet of 24 new Travel-Air training planes, kept in flying trim by a corps of crack mechanics. Every power plant of consequence in aviation from the little Velie, the Caminez and the Whirlwind, to the old reliable OX-5, its big brother, the OX-6 and the big Liberty.

You are 15 minutes from the downtown district of St. Louis, on one of the most popular airports in the country. Here you see the country's noted cross-country pilots as they drop in for an overnight stop. Here, too, you meet other students from every state in the union and from Canada and Mexico.

Decide Now!

No other business has grown with the rapidity of aviation. Every day that you waste in getting into the game means a score or more men are going to be ahead of you in the race for the splendid positions aviation offers.


PARKS AIR COLLEGE
AFFILIATED WITH PARKS AIRLINES INC

FILL IN THE COUPON NOW!

PARKS AIR COLLEGE, Inc.
202-P Mo. Theatre Bldg., St. Louis, Mo.

Send me your book "Skyward Ho" with full information about your course.

Name ....

Address ....

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PARKS AIR COLLEGE

202-P Missouri Theatre Building
ST. LOUIS, MO.
Cable Address; PARKSAIR
Member Aeronautical Chamber of Commerce

PRESTIGE

Stromberg carburetors are used as standard equipment by—

- AIRCRAFT ENGINE CORP.
- THE ALLIANCE AIRCRAFT CORP.
- ALLISON ENGINEERING CO.
- AXELSON MACHINE CO.
- CURTISS AERO & MOTOR CO.
- FAIRCHILD CAMINEZ ENG. CORP.
- KINNER AIRPLANE & MOTOR CORP.
- LEBLOND AIRCRAFT ENGINE CO.
- NAVY DEPARTMENT
- PRATT & WHITNEY AIRCRAFT
- VELIE MOTORS CORP.
- WAR DEPT.—AIR SERVICE
- WARNER AIRCRAFT CORP.
- WRIGHT AERO. CORP.

THE FACT that the man on the street—the mechanic in the shop—the engineer in the laboratory—know and recognize that STROMBERG stands for dependability of performance—

THE FACT that recognition of Stromberg dependability has come as a result of years of efficient service on all types of aircraft—

THE FACT that behind this recognition is a record of honest work, expert craftsmanship, and real merit—

Do not these facts lend PRESTIGE to the name of Stromberg—and to every name associated with it?

STROMBERG MOTOR DEVICES COMPANY
58-68 E. Twenty-fifth Street CHICAGO, ILL.

FACTORY BRANCHES

New York, N. Y. Detroit, Mich. Minneapolis, Minn.
Kansas City, Mo. London, England

"It can't be done", said the aeronautical world . . . BUT FOKKER DID IT!

WHEN Western Air Express, backed by the Guggenheim Fund, prepared to establish the world's model passenger airway between Los Angeles and San Francisco, their staff laid down the equipment requirements which they believed necessary for a dependable and profitable operation.

The specifications called for an airplane combining high cruising speed, moderate landing speed, generous pay load capacity, and other features of comfort and economy never before built into any aircraft.

All of America's best known airplane builders were invited to bid on the production of these planes. Some refused to even attempt to build such a ship. Some offered to attempt it, but without guarantee of success.

Fokker read the specifications . . . and guaranteed unconditionally to meet them.

The Fokker F-10 is the result. It has not only met, but exceeded every one of the requirements. In a year of service for Western Air Express between Los Angeles and San Francisco, these ships have set absolutely perfect records. Western Air Express now operates 14 of them. Already more of these ships are in commercial service than any other plane of their capacity in the world.

They furnish added proof of what has been demonstrated many times before during the past twenty years *. . . that Fokker designs and construction set the highest standards known in the world of aviation.*

OTHER commercial lines using Fokkers are Universal Aviation Corporation; Texas Air Transport; Standard Air Lines; National Parks Airways; Pan American Airways; Western Canada Airways; Dominion Airways.

FOKKER AIRCRAFT CORPORATION OF AMERICA

Factories: WHEELING, WEST VIRGINIA, *and* TETERBORO AIRPORT, HASBROUCK HEIGHTS, NEW JERSEY
Address inquiries NEW YORK OFFICE, 110 EAST 42nd STREET

BELLANCA

Facts... where the facts are known,

the Bellanca is bought. *Performance*—test the Bellanca CH against any cabin plane of equal engine power, for speed, load, take-off, and climb—and the Bellanca wins! Ask for Bellanca performance figures—get a statement *with a guarantee*. *Strength*—check up the Bellanca's structural strength—13% stronger than Department of Commerce requirements! *Stability*—fly the Bellanca "hands off," fly it up, down, level, on the throttle alone—turn it on the rudder without the ailerons, on the ailerons without the rudder—*stall* the Bellanca and note its instant recovery! Is there an airplane with more perfect stability? *Comfort*—ride in the Bellanca, talk in comfort with your flying companions, look closely at its upholstery and luxurious finish . . . Consider the *facts*—and your belief in Bellanca transportation as the reasonable, sensible means of present day travel is clinched. Bellanca Aircraft Corporation, New Castle, Delaware.

The Bellanca Distributor Franchise

is a foundation of strength for the profitable development of the distributor's business. It is sound, liberal, and earns the immediate respect of any banker. In this franchise distributors are assured of the complete cooperation of a solidly financed and capably managed manufacturing company with thoroughly organized production facilities.

The Bellanca CH300

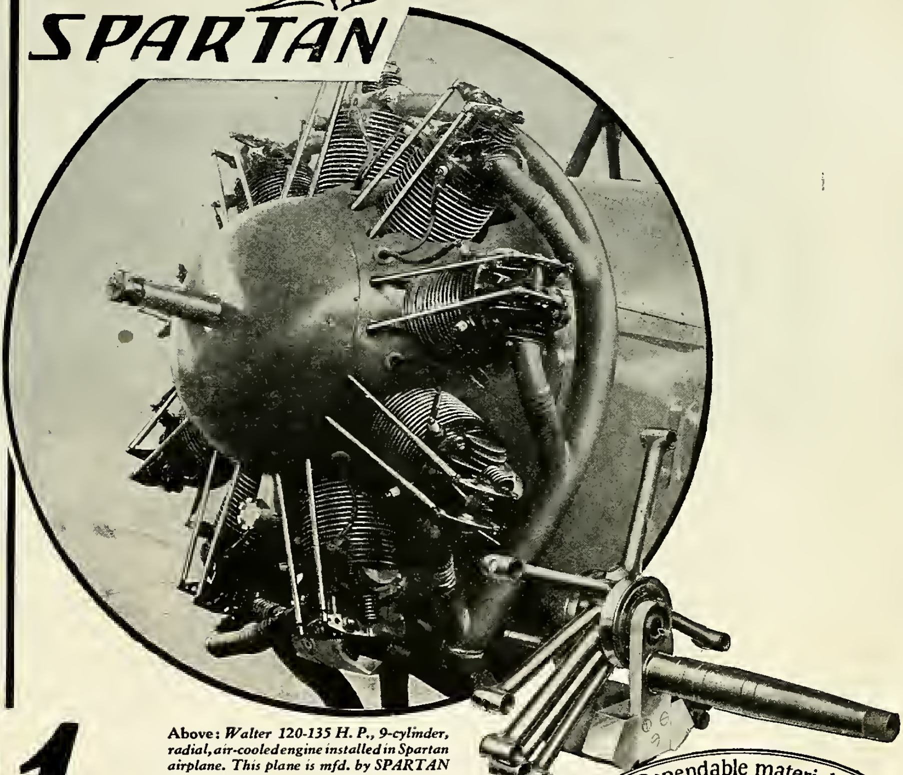
U. S.
Department of Commerce
Approved Type Certificate
No. 129

Acknowledged leader for efficient performance in the Whirlwind - engined class of cabin planes. Quickly disassembled into small, easily-shipped and easily-handled units. Two pilots; dual control; greatest known range of visibility. Seats six persons in comfortable, tastefully appointed cabin. Pilot and payload, 1,215 lbs. Range with full payload, 5½ hrs. or 670 miles at cruising speed. High speed, 145 m.p.h. Cruising speed 122 m.p.h. Landing speed 48 m.p.h. Climb at sea level, 1,100 ft. per min. List price: with Wright J-6 engine, $14,950 (with J-5 engine, $14,050).

Nickel Alloy Steel Parts in Walter Aircraft Engine

- Front crankshaft
- Rear crankshaft
- Master rod
- Articulating rods
- Wrist pins
- Piston pins
- Valves
- Cylinder sleeves
- Oil pump shaft
- Springs
- Induction tubes
- Magneto gears
- Cam gears
- Oil pump gear
- Crankshaft ball bearings
- Nuts and studs
- Thrust bearings
- Propeller hub
- Cam ring
- Tachometer drive shaft, gear
- Push rods

SPARTAN



Above: *Walter 120-135 H. P., 9-cylinder, radial, air-cooled engine installed in Spartan airplane. This plane is mfd. by SPARTAN AIRCRAFT CO., Tulsa, Oklahoma.*

Right: *Nickel Chromium Steel crankshaft, master and articulating rods used in Walter engine, mfd. by J. WALTER & CO., Prague, Czecho-Slovakia.*

Dependable materials are the best assurance of dependable performance

21 Nickel Steel Parts

Perform Dependably in Walter Aircraft Engines

RECENTLY a Spartan airplane powered by a Walter 120-135 H.P. radial, air-cooled engine was flown on a non-stop flight from Walkersville, Ont., to Key West, Fla., in 17½ hours. The plane took off successfully with a load equivalent to 120% of its own weight.

The remarkable performance of the Walter engine is undoubtedly due to the excellence of its design and the use of structural materials having dependable mechanical properties.

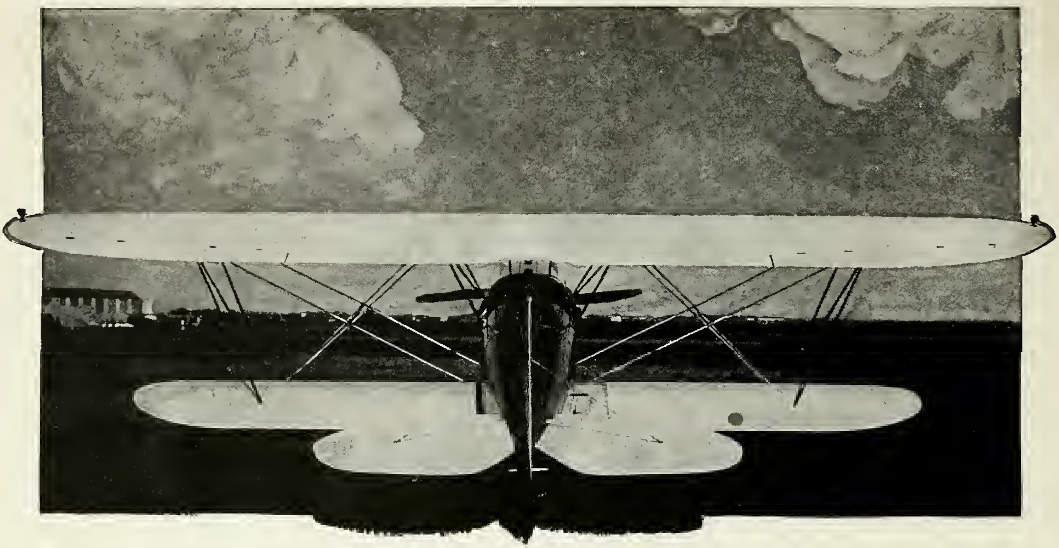
Over twenty-one different parts of the Walter engine are made of Nickel Alloy Steel. Because of its hardness and toughness, Nickel Alloy Steel assures maximum resistance to wear and freedom from breakage when weight of parts must be pared to a minimum.

Extensive tests have shown that the average, maximum and minimum values of Nickel Alloy Steel vary less from heat to heat than other commercial steels—that their mechanical properties are dependably uniform. With this dependable uniformity established beyond question, practically all manufacturers of airplane engines, both in America and Europe, have adopted Nickel Alloy Steels for highly stressed parts which must have utmost dependability without excessive weight. Information on the properties and applications of Nickel Alloy Steels will be gladly furnished by our staff of engineers.

Nickel
FOR ALLOY STEEL

SEND FOR "BUYERS' GUIDE TO NICKEL ALLOY STEEL PRODUCTS"

INCO NICKEL THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL STREET, NEW YORK, N. Y. INCO NICKEL



PERFECTION

Nowhere in the aeronautic field can greater *perfection* be found than in the construction of the BIRD:

Front stick and rudder quickly detached
Chrome Molybednum throughout
Minimum factor of eight plus
Wired for lights and air speed
Panel instrument board
Baggage compartment
Silent—oil and rubber shock absorber
Five gallon reserve fuel tank
Tunnel type radiator
All parts easily accessible
Adjustable stabilizer
Wheels visible from pilot's cockpit

PERFORMANCE

***Greater performance per horsepower* is the keynote of Bird leadership equipped with Curtiss OX-5.**

High Speed . . .	120 M. P. H.	Take Off Run	100 Ft.
Landing Speed . .	35 M. P. H.	Rate of Climb . .	1,000 F.P.M.
Cruising Speed . .	100 M. P. H.	Absolute Ceiling . .	20,000 Ft.
Gas Consumption at 100 M. P. H.	5 gals. per Hr.	Endurance at Cruising Speed . .	9 Hours

PRODUCTION

Perfect DESIGN and PERFORMANCE together with *PRODUCTION* make the BIRD 3-place biplane the most desirable of all popular priced ships. *A plane a day* factory schedule assures our dealers *prompt delivery.*

Dealers' franchises for this plane are still available in some territories.

Dept. of Comm. Approval No. 101

BIRD

"Safety and Performance"

Brunner-Winkle Aircraft Corporation

1-17 Haverkamp St., Dept. A-1
Glendale, Brooklyn, N. Y.

HOW MUCH DOES IT COST YOU TO TRAIN A PILOT?

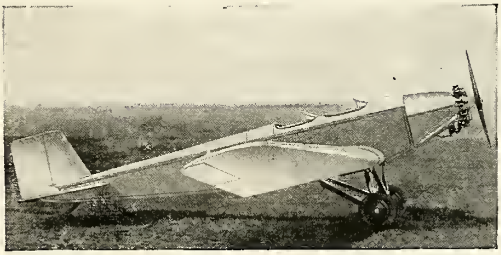
Average Plane Used for Training 90 to 110 H. P.	Aeromarine Klemm AKL25 Monoplane 40 to 50 H. P.

Hourly Operating Costs	Average Training Plane Per Hour	AKL25 Per Hour
1 — Engine Depreciation		
(a) Salmson AD9 engine at $1400 cost; 2000 Hrs. life		$0.70
(b) Average 90 to 110 H. P. engine at $2500 cost; 1500 Hrs. life	$1.66	
2 — Oil and Gasoline	$3.90	$1.80
3 — Overhauls		
(a) Salmson AD9 every 300 Hrs. at $150 cost . . .		$0.50
(b) Average 90 to 110 H. P. engine every 250 Hrs. at $250 cost	$1.00	
4 — Instructor's hourly rate of pay	$5.00	$5.00
*Total Hourly Operating Expenditure .	$11.56	$8.00

---

* In-as-much as flying school organizations and the conditions under which they operate vary considerably, the above comparative figures apply only to the *in-the-air* hourly operating costs. They do not include the initial cost of plane, its depreciation and annual overhaul, or insurance and allowance for crash losses—rent of hangar and field or executive overhead and business-getting expenses.

YOU can't keep your school up—unless you keep your costs down. Your flying equipment may stand all tests for safety—but will it stand the test of making your school profitable? Training pilots is a business. It may be the work you like best—you may get a kick out of it—but unless it is commercially safe and profitably sound—it is headed for a crash—and with it your success and dreams of independence. The comparative figures above will stand the most rigid investigation. We realize that we are doing a daring thing in publishing them . . . but the figures represent facts . . . facts that speak for themselves . . . facts that should prove tremendously important and profitable for you—whether you are now operating a school, or planning to do so. Eight years of the utmost popularity and success, as a training plane at home and abroad, are back of every statement made here about the AKL25. Its demonstrated economy of operation will help to make any school profitable. The AKL25, moreover, requires the minimum of maintenance. Write for literature.



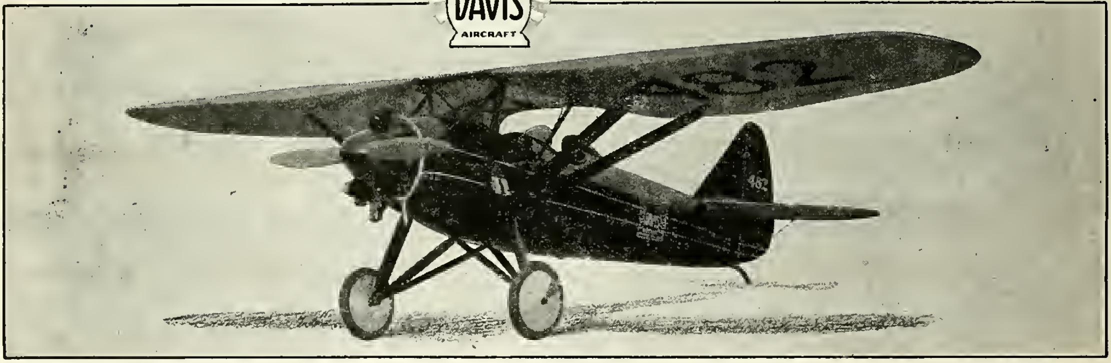
AEROMARINE KLEMM CORPORATION

Paramount Building · 44th Street *and* Broadway · New York City

STABILITY

Beyond Previous Light-Plane Experience

DAVIS AIRCRAFT



THE Davis V-3 Monoplane combines all the qualities desired by the flying school and the private owner of moderate income—airworthiness—maneuverability—the capacity to stand rough handling—low operating and maintenance costs.

The exclusive Davis wing design has brought to the light plane field a degree of stability beyond previous experience—yet without sacrifice in performance.

The V-3 is of all-metal construction throughout, with the exception of wing spars and fabric covering. Safety factors are in excess of Department of Commerce requirements.

Engineered throughout for modern aircraft motors—fine in design—the Davis Monoplane naturally operates at unusually low cost. School operators, and individual pilots contemplating the purchase of a plane, will find much to interest them in the complete story of the Davis Monoplane, which will be forwarded on request . . . Many rich territories are still open on the Davis Monoplane. Responsible dealers are invited to write for complete details of the Davis Franchise.

$2965
Flyaway at field
Complete
with LeBlond 60 H.P.
Radial Engine

DAVIS AIRCRAFT CORPORATION, *Richmond, Ind.*

PERFORMANCE

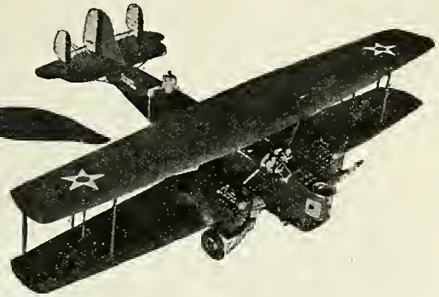
(Actual)

Service Ceiling	10,000 feet
High Speed	95 M. P. H.
Landing Speed	38 M. P. H.
Cruising Speed	80 M. P. H.
Climb	700 ft. per minute
Fuel Consumption at Cruising Speed	4 1/2 gallons per hour
Cruising Range	350-400 miles

DAVIS V3 MONOPLANE

A 2-PLACE HIGH-WING MONOPLANE—"THE AMERICAN MOTH"

WANTED PILOTS



Let Greer Train You for a Big Future in AVIATION

Mechanics
Repairmen
Assemblers
Engineers
Builders
Contractors
Motor Experts
Designers
Instructors
Salesmen

Ask yourself this question: What will the aviation industry amount to in a year or so? And you know the answer—it will be America's most gigantic industry.

And question number two: Isn't it logical to assume that the men who get into aviation now will grow with the industry and be among the leaders "tomorrow?" We all know that to be so.

Even today, though aviation is still in its infancy, there is a big demand for pilots, for men in aviation factories—air transport companies—passenger and express service—air mail—barnstorming—aerial photography, motion picture work, crop dusting, etc. Opportunity! Fellows, aviation teems with it. Reason it out for yourself: thousands of passengers and tons of mail and freight are now being swiftly and safely carried all over the country daily. Manufacturers are all behind in supplying the demand for airplanes. Why? Because there are not enough men ready to step in and function in the various branches of the industry.

GREER TRAINING MAKES YOU AN EXPERT

In the great seven and four story Greer shops you learn on actual equipment. And what training! You learn metal construction—wing building—woodworking—engine repair—acetylene welding—carburetors—ignition—complete airplane construction—rebuilding—repairing—meteorology and navigation.

Is it any wonder that students from all over the world are to be found in the Greer Shops?

REAL FLIERS TRAIN YOU

Well-known fliers—men like Captain J. C. Bryan, with many years' Army and civilian flying instruction experience, C. L. Laird, and others who have made names for themselves in aviation—are the men who will supervise your training.

Why not insure yourself for a real future in this amazing industry?

FREE FARE TO CHICAGO

When you enroll I'll pay your fare from any point in the U. S. And don't let the lack of money hold you back. We will assist you in getting employment while you are studying—and after you graduate assist you to get a still better position.

RUSH COUPON FOR FREE BOOK

I want to mail you—free—my big aviation book. I want you to learn about the many remarkable and exclusive features of the Greer College. Learn why I say that when better pilots are trained, Greer will train them.

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Please mail me free, your big aviation book and full details about your Training and Employment Service.

Name ....
Address ....
City .... State ....
Age .... Occupation ....

GROUND FLOOR WORK TO THE SKY'S LIMIT !

Wherever there's WATER★. . .

★The total area of the United States alone comprises 3,121,489 sq. miles of both land and water, of which 147,713 square miles is water (not including the Gulf of Mexico). In this gross area there are 2,113 known airports and intermediate landing fields.

Assuming each airport and intermediate landing field to be at least 120 acres in size, the total available *known* landing facilities for land planes would approximate only 396 square miles.

Compare this total landing area for land planes (396 square miles) to the 147,713 square miles of water, suitable for the safe landing of flying boats (and, therefore, their commercial use) in most any part of the United States.

● ● ● there's a reason for The Commodore—the giant, thirty-two passenger flying boat—the sister-ship of the famous Consolidated Navy Patrol Plane XPY-1.

For coastal aerial service or for transportation between cities with harbor facilities, and on routes operating over water-ways, The Commodore not only minimizes overhead and upkeep, but offers many distinct advantages that appeal to the air-minded traveler.

Inasmuch as its terminals are municipal harbors, The Commodore does away with the usual loss of time for passengers and mail between the center of town and the airport, which is ordinarily far beyond the city limits.

The Commodore instills a greater degree of confidence in the air traveler's mind, due to its ability to land at any point along the route.

The Commodore precludes the need of flying at high altitudes, and in so doing gives the passenger a feeling of much greater speed and comfort.

The Commodore enhances navigation, because at night and when flying in fog or haze the most visible objects below are bodies of water.

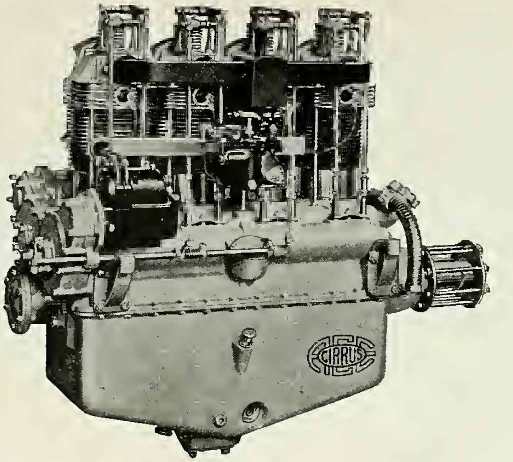
The Commodore can operate in any kind of weather, and will land and take-off in a heavy sea, if necessary.

The Commodore is a modern Leviathan with a cruising speed well over 100 miles an hour.

For more complete particulars, write us. We will gladly submit facts and figures that show how and why The Commodore fulfils the immediate and growing needs of air transportation . . . wherever there's water.

CONSOLIDATED AIRCRAFT CORPORATION
BUFFALO, NEW YORK

The COMMODORE



Still Another User of U. S. Hammered Aviation Piston Rings:

AMERICAN CIRRUS MARK III

(Four-Cylinders-in-Line, Vertical, Air-Cooled)

The Pre-eminent Aviation Piston Ring

Side-Hammered Tested and Proven!

THE American Cirrus Mark III, 100 horsepower, which is recognized as one of the most efficient and reliable of low-power aviation engines ever produced, is also standardized with U. S. Hammered Aviation Piston Rings.

This motor very recently went into production in a large way. And already 80 per cent. of the first year's total output on it has been contracted for, with the expectation that the balance will be sold within the next few weeks.

In so standardizing on U. S. Hammered Aviation Piston Rings, American Cirrus Engines, Inc., has squarely lined up with the following aviation-engine manufacturers who similarly standardize their motors:

Aircraft Engine Co., Inc.
Alliance Aircraft Co.
Curtiss Aeroplane & Motor Co.
Pratt & Whitney Aircraft Co.
Wright Aeronautical Corp.
and others to be announced.

We are solving the aviation piston ring problems of the above manufacturers. We can do the same for any. *"If It's a Piston Ring, We Can Make It."*

U. S. HAMMERED PISTON RING CO.
Irvington, N. J.

Oil Shall Not Pass

AERONAUTICAL CHAMBER OF COMMERCE

U S AVIATION HAMMERED PISTON RINGS

US HAMMERED

At the Detroit Show...

visiting test pilots agreed that the Taper-Wing Sport WACO demonstrated more sheer maneuverability than any other airplane they had ever seen... military or commercial.

This WACO Model is being sold to several foreign governments for advanced training purposes.

THE ADVANCE AIRCRAFT COMPANY, TROY, OHIO

WACO AIRPLANES

"ASK ANY PILOT"

Look to Goodyear

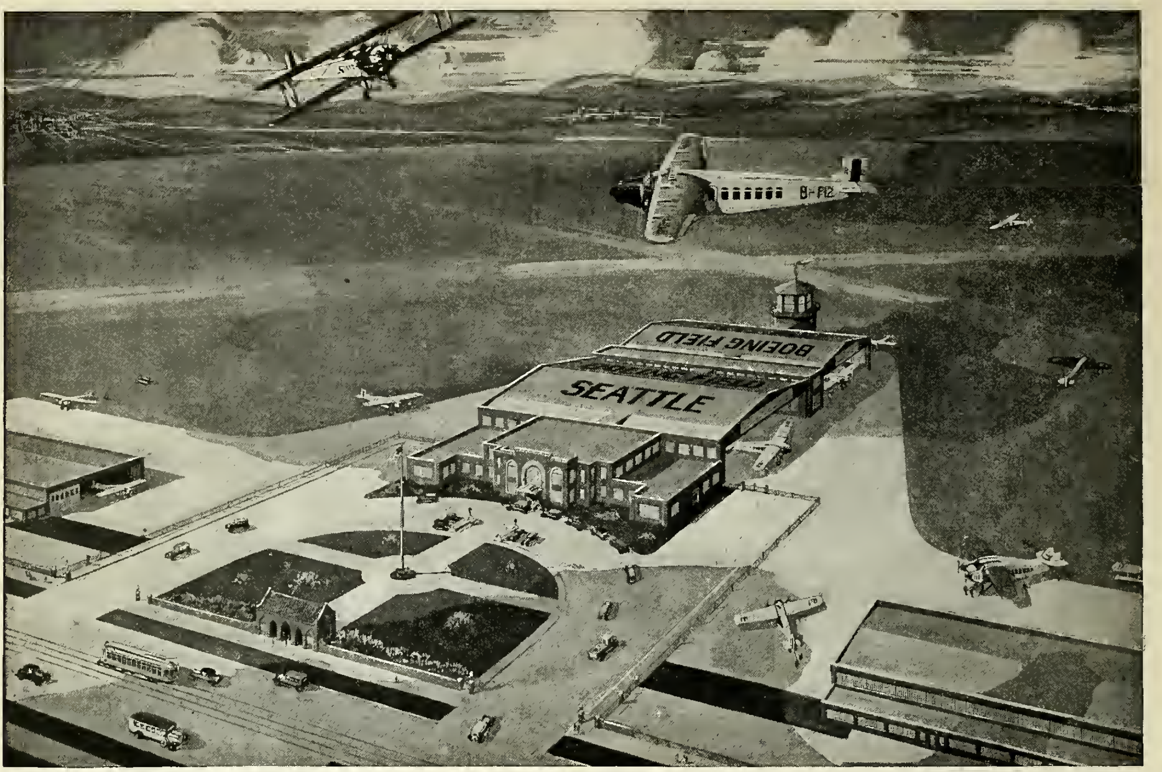
Here at Goodyear we have a large and veteran department that has just this one job: *to do everything possible to give help to you men who design*, or *build*, or *operate airplanes.*

Whatever your problem, bring it to Goodyear. If you need data on Goodyear Airplane Tires, we have it. Or if you want to know if some part, or item of equipment can be fashioned from, or made better, by rubber, ask Goodyear.

Any question will get prompt, sympathetic attention and understanding. Write, wire or telephone.

Aeronautics Department
GOODYEAR, AKRON, OHIO,
OR LOS ANGELES, CALIFORNIA

EVERYTHING IN RUBBER FOR THE AIRPLANE



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This is number three of the Berryloid fleet—composed of ships that are finished 100 per cent with Progressive Aircraft Finishes. The color scheme and unusual markings on this ship were inspired by the Ruby-throated Humming Bird. Here Berry Red is in harmonious contrast with Lusk Green, Nungesser Green and French Gray—standard Berryloid colors.

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AIRCRAFT FINISHES

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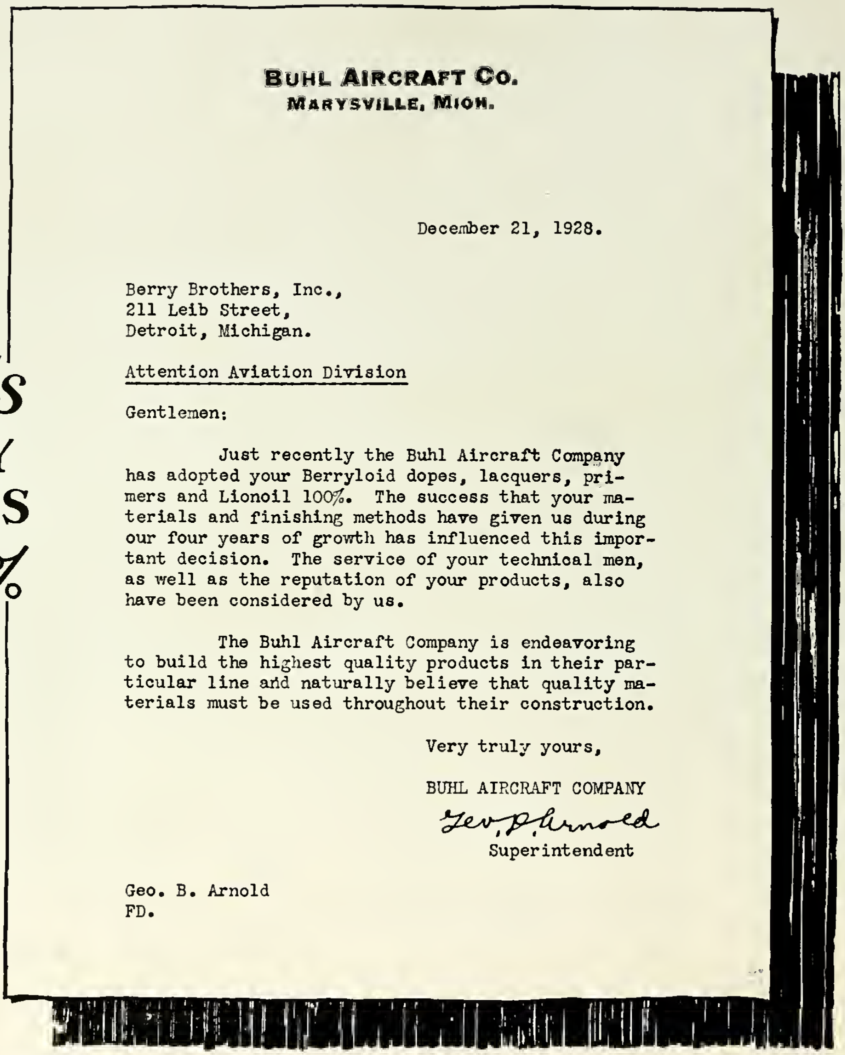

BUHL AIRCRAFT CO.
MARYSVILLE, MICH.

December 21, 1928.

Berry Brothers, Inc.,
211 Leib Street,
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Attention Aviation Division

Gentlemen:

Just recently the Buhl Aircraft Company has adopted your Berryloid dopes, lacquers, primers and Lionoil 100%. The success that your materials and finishing methods have given us during our four years of growth has influenced this important decision. The service of your technical men, as well as the reputation of your products, also have been considered by us.

The Buhl Aircraft Company is endeavoring to build the highest quality products in their particular line and naturally believe that quality materials must be used throughout their construction.

Very truly yours,

BUHL AIRCRAFT COMPANY

Geo. B. Arnold
Superintendent

Geo. B. Arnold
FD.

After successful experience extending over a period of four years the Buhl Aircraft Company has decided to adopt Progressive Aircraft Finishes exclusively. This manufacturer is the third to be featured in Berry Brothers' new color series, being preceded by Stinson and Fokker, large users of Berryloid.

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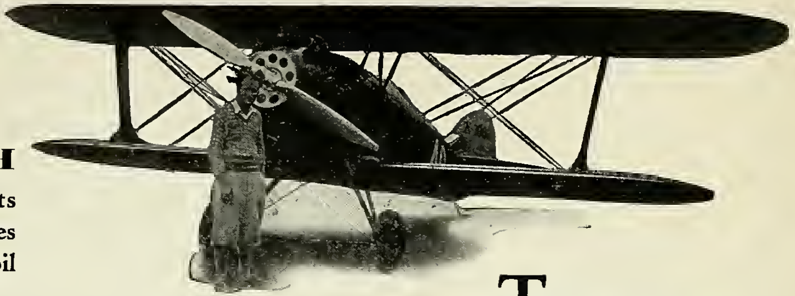
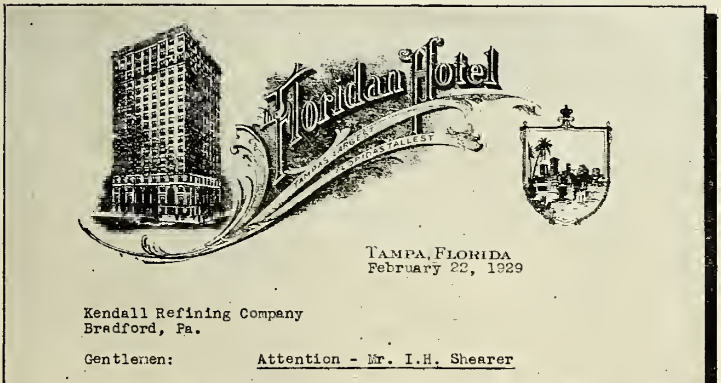


E. E. BALLOUGH

performs a series of flying feats that attest the sporting qualities of pilot, plane and—lubricating oil



Floridan Hotel
Tampa's Largest Florida's Tallest

Tampa, Florida
February 22, 1929

Kendall Refining Company
Bradford, Pa.

Gentlemen: Attention - Mr. I.H. Shearer

You will no doubt be interested in the results I have been getting with the use of Kendall Motor Oil.

I made the trip from Chicago to Miami in my Laird L C-R, arriving there just 15 minutes prior to the beginning of the 200 H.P. Open Cockpit Race. I did not take time to examine the oil nor was any added, and I am glad to say that I won first place. Re-entered the ship the next day, and, also won that race.

I then examined the oil and found it in very good condition, added a small amount and two days later with Mr. Charles Dickinson, as passenger, made a dawn to dusk flight from Miami to Chicago in 9 hours, 59 minutes actual flying time, and upon reaching Chicago still found that the oil was in excellent condition.

On both legs of the round trip and in the races the motor was run with wide open throttle and I must say that Kendall Oil held up remarkably well under such severe duty. The temperature ranged from hot to cold, but the pressure remained constant, the motor turned over very easily in starting and the oil showed a very good body on the return to Chicago.

Kendall Oil certainly bears out the claim you have made for it and I am very glad to tell you how well I am pleased with its performance.

With kindest regards, I am

Sincerely yours,

E. E. Ballough

THE series of grueling consecutive flights—two over long distances and two in competitive races—described by Mr. Ballough in his letter reproduced here, demonstrates conclusively the ability of Kendall Penzbest Oil to perform with maximum efficiency over an extended period WITHOUT CHANGE.

Flying from Chicago to Miami in his Laird L C-R Whirlwind, starting in the 200 H. P. open cockpit race *fifteen minutes after arrival,* winning the race, winning another race in the same class the following day, flying back from Miami to Chicago from dawn to dusk in 9 hours and 59 minutes, with Charles Dickinson as passenger—all without changing his Kendall Penzbest Oil, is an accomplishment that could be achieved only with *an oil with a specified change period of 30 hours.*

Mr. Ballough reports that the motor was run with wide open throttle both on the round trip and in the races and that the temperature changed from hot to cold, but that the oil pressure remained constant, the motor turned over easily in starting and the Kendall Penzbest oil showed very good body on return to Chicago.

We wish to add no comment of our own to the above. Owners, operators and pilots will recall that the qualities which give Kendall Penzbest Oil its remarkable stamina are inherent in the crude from which it is exclusively derived—the Bradford Grade of Pennsylvania Crude—the finest grade known to the oil industry.

For a list of airports where Kendall Penzbest is now obtainable, address Aviation Division, Kendall Refining Company, Bradford, Pa.

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**REFINED FROM 100% BRADFORD
GRADE OF PENNSYLVANIA CRUDE**

"ALCLAD"

ALLOY MAKES FORD PLANES PROOF AGAINST CORROSION

THE all-metal feature of the Ford plane has always presented many well-understood advantages over other materials. Both from the standpoint of low up-keep expense and long life, metal offers economy and security in its freedom from rotting, warping, splitting, tearing—in its resistance to wear and vibration—in its definitely determined strength—in its unvarying good appearance.

The one drawback associated in the minds of the public with all-metal construction—corrosion—is obviated in the Ford tri-motored transport by the use of "Alclad" alloy on all exposed wing, fuselage and control surfaces.

Pure aluminum, as you probably know, does not corrode. It is only when aluminum is alloyed to provide strength that aluminum becomes somewhat susceptible to corrosion. "Alclad" alloy combines the corrosion-proof quality of pure aluminum with the strength of duralumin.

A sheet of "Alclad" alloy is something like a sandwich. The two surfaces are non-corroding, 99.7% pure aluminum. Between these two surfaces is the strength-providing duralumin.

"Alclad" alloy can be rolled into a sheet as thin as paper and still have exactly the same proportionate sheath of pure aluminum on its surface. The aluminum is an integral part of the sheet.

Another astonishing peculiarity is that it does not corrode at its edges, or where rivet holes expose the duralumin core. Corrosion results from stray electric currents flowing between minute positive and negative areas on the metal. The pure aluminum surface has the specific electrical property of controlling any such stray electric currents so that the strong aluminum alloy core is unaffected. Such edges have been exposed to as much as 18 months' attack by salt water without the slightest deterioration!

All the unexposed parts of the Ford plane that are made of duralumin are coated with moisture-proof, protective lionoil. As these parts are never subjected to wear, friction or abrasion, the coating is a positive preventive of corrosion.

These provisions remove all question about the feasibility of using Ford planes either as seaplanes or as land planes in localities adjacent to salt water. The Ford plane is just as desirable, just as dependable, just as efficient on work along the seaboard or over ocean stretches as it has always proved everywhere else, even in the Arctic and Antarctic.

Complete information about all the features of design, construction and performance of the Ford plane may be obtained by writing direct to The Stout Metal Airplane Company, Division of Ford Motor Company, Dearborn, Michigan.

Volume 14
No. 5

AERO DIGEST

MAY
1929

THE MAGAZINE OF THE AIR

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Cover Design—Fokker Trimotor of the Western Air Express. Scenic effect—Lake McDermott, Glacier National Park, Montana. *Courtesy of Great Northern Ry.*

AERO DIGEST

Telephone: Wisconsin 3771.
is published monthly by
Cable Address: AERODIG

THE AERONAUTICAL DIGEST PUBLISHING CORP., 220 West 42nd Street, New York City

Frank A. Tichenor, President. **A. Horsfall, Vice-President.** **K. Healy, Secretary.**

George F. McLaughlin, Editor. **Robert B. Renfro, Associate Editor.** **William A. Rogers, Advertising Manager.**

Contributing Editors: Dr. Michael Watter, Cy Caldwell, Don Rose, Edgar H. Felix.

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Single Copy 35c. Yearly Subscription $3 ; Canada $3.50 ; Foreign $4.

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From photograph by Engineering Div. U. S. Army Air Corps.

The Army Air Corps' high altitude airplane, X-CO5-A, Which Captains Streett and Stevens flew to a record altitude of 37,854 feet from Wright Field, Dayton, Ohio

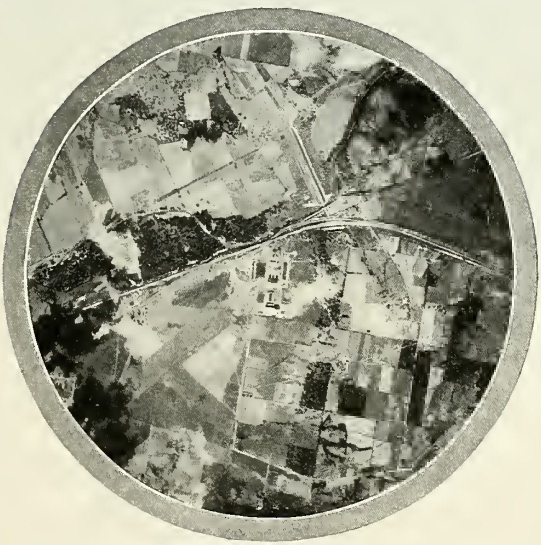
ALTITUDE FLIGHTS

By H. B. Henrickson

Aeronautic Instruments Section
National Bureau of Standards

DURING the year 1928, a number of interesting altitude flights were made, both in military and commercial ships. These flights included seaplanes with various pay loads, landplanes with and without observer, and commercial planes piloted in most cases by women. Especially notable during the year was the interest displayed by women pilots in altitude flying. Indications are that their competition for performance honors will continue, and will become increasingly keen. During the year, no balloon flights of importance took place. Although many altitude trials were made, only a few received recognition as official world records.

The first flight of the year was made on May 28th from the waters of the Delaware at Philadelphia, Pa., by Lieut. Zeus Soucek, U. S. N., in a PN-12 seaplane which carried a pay load of 1,000 kilograms (2,200 pounds). The ship, a product of the Naval Aircraft Factory, was powered with two Wright R-1750 Cyclone air-cooled engines of 525 horsepower each. The ship carried two dual traverse barographs prepared with smoked drums, which had been officially sealed by a representative of the contest committee of the National Aeronautic Association. These instruments were used to record the maximum altitude attained during the flight. Incidentally, they also served to give some indication as to the climb performance of the ship during the trial. Shortly after the flight the barographs, through the National Aeronautic Association, were forwarded to the Bureau of Standards for the determination of maximum altitude. The technique of testing high altitude barographs has been described in detail in the May, 1928, issue of AERO DIGEST. The instrument giving the better trace, consequently selected as "official," was calibrated against a standard mercurial barometer. The result of the test on the official instrument gave a minimum or ceiling pressure of 406 millimeters of mercury. From the Federation of Aeronautique Internationale pressure-altitude table, 406 millimeters of mercury is equivalent to 4,881 meters, or to 16,014 feet. This was considerably below the altitude record for a pay load of 1,000 kilograms.



Viewing Wright Field, Dayton, Ohio, (center) from 32,400 feet altitude. Photograph made by Capt. Stevens, U. S. Army Air Corps.

On June 15th, Lieut. Arthur Gavin, U. S. N., took off from the Delaware River at Philadelphia in the PN-12 seaplane, which now carried a pay load of 2,000 kilograms (4,400 pounds). The ship this time was powered with two Pratt and Whitney Hornet engines of 525 horsepower each. The barograph carried in this flight, when checked against the standard barometer, indicated a minimum pressure of 471 millimeters of mercury, which is equivalent to 3,776 meters, or to 12,388 feet. This altitude trial was repeated on June 26th, at which time a somewhat better performance resulted.

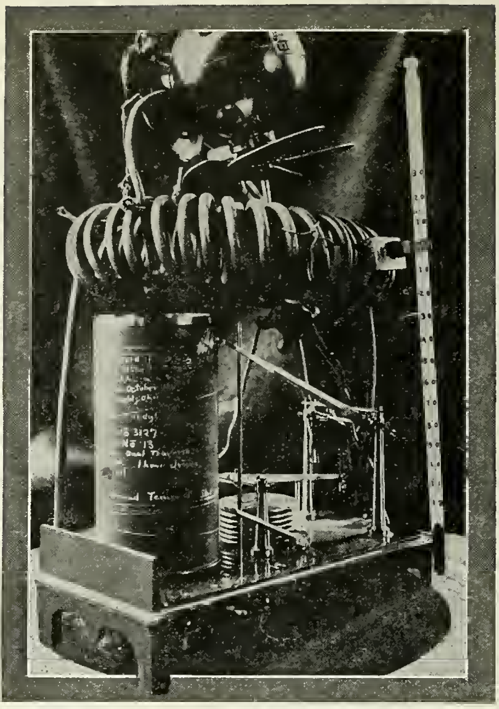
On the following day, June 16th, Lieut. Arthur Gavin, U. S. N., made another flight with the same ship and the same engines. The pay load carried in this case was 1,000 kilograms. The minimum or ceiling pressure was found to be 380 millimeters of mercury, which is equivalent to 5,362 meters, or to 17,592 feet.

On the same day, June 16th, Lieut William H. Bleakley, U. S. A., at Wright Field, Dayton, Ohio, made a flight in the Army XCO-5A landplane powered with a 12-cylinder Liberty water-cooled motor of 400 horsepower, supercharged with the General Electric type supercharger. All high altitude planes, of course, are equipped with some type of supercharger which supplies air at sea-level pressure to the carburetor. Without such a device, there would be a decided falling-off in engine power with increasing altitude, which, in turn, would mean a lowered ceiling for the plane. On this flight, which lasted 1 hour and 47 minutes, the pilot wore an electrically heated flying suit and heated goggles. The electrically heated wires over the glasses of the goggles prevented the formation of frost or ice which otherwise would eventually obscure the vision. At the ceiling of this flight, the altimeter in the pilot's cockpit read 40,000 feet. It was thought that a new record had been established; therefore, the barograph used in the flight was forwarded to the Bureau of Standards for calibration. Because no temperature data were obtained during the flight, the barograph, for purposes of the test, was assumed to be at 35° C when at the ceiling of the flight. The result of this calibration gave a minimum pressure of 162 millimeters of mercury, which is equivalent to 11,128 meters, or to 36,509 feet. This altitude, although approximately the same as that made by Lieut. Macready on April 10, 1926, was considerably short of the existing world's record, 38,418 feet, now held by Lieut C. C. Champion, U. S. N.

On June 26th, Lieut. Arthur Gavin, U. S. N., took off from the Delaware River at Philadelphia, making another flight in the PN-12 seaplane which again carried a pay load of 2,000 kilograms. As before, the power plant consisted of two Pratt and Whitney Hornet engines of 525 horsepower each. When the dual traverse barograph was checked, the minimum pressure attained was found to be 416 millimeters of mercury, which is equivalent to 4,702 meters, or to 15,426 feet. This performance was a decided improvement on that of June 15th. Also, it proved to be an American record for a seaplane carrying 2,000 kilos pay load.

On June 27th, a third altitude attempt was made at Philadelphia with the PN-12 seaplane carrying a pay load of 1,000 kilograms. As before, the ship was equipped with two Pratt and Whitney engines of 525 horsepower each, and was piloted by Lieut. Arthur Gavin, U. S. N. The minimum pressure was determined to be 349 millimeters of mercury, which is equivalent to 5,972 meters, or to 19,593 feet. This was an officially recognized world's record for a seaplane carrying a pay load of 1,000 kilograms. The performance honor, however, was short lived, for this record was exceeded November 7th at Dessau by the Germans in a Junkers W-34 seaplane powered with a Bristol Jupiter VII engine of 420 horsepower.

On July 27th, at Staag Lane, England, Capt. G. de Havilland and Mrs. de Havilland made a flight in a D. H. Moth 60-G landplane, a light ship of the first category, powered with a D. H. Gipsy motor of 85 horsepower. In the flight a ceiling pressure of 345 millimeters was attained, which is equivalent to 6,054 meters, or to 19,862 feet. This was an official world's record for a light plane.



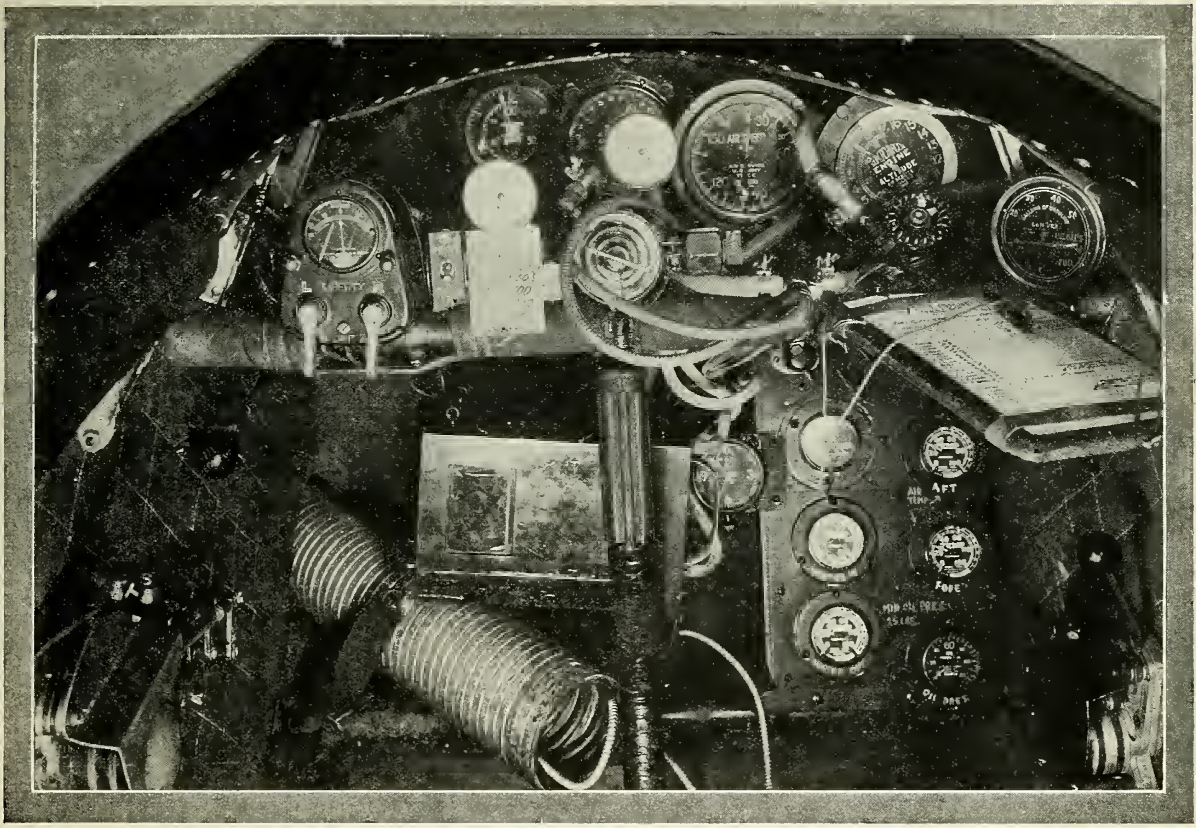
Barograph used by Captains Streett and Stevens.

Capts. Streett and Stevens and the camera used in taking the photograph shown on the preceding page.

On July 31st, at the Naval Air Station, Anacostia, D. C., Lieut. C. C. Champion, U. S. N., made a flight in the Wright Apache landplane powered with a new Pratt and Whitney Wasp air-cooled engine of 425 horsepower, equipped with a Root's type supercharger. In this trial Lieut. Champion hoped to break his own world's altitude record. Two high altitude barographs were sealed and installed in the ship by the author, who had the privilege of serving as official observer for the National Aeronautic Association. The two instruments, placed within a barograph compartment located just behind the pilot's cockpit, were supported at the corners by rubberized cords. To a large extent these cords absorb the vibrations of the plane and allow the instruments to make fine, clean-cut traces on smoked charts. Attached to the base of each instrument close to the pressure sylphon, was a bimetallic strip temperature recorder. This arrangement gives a record of the temperature of the barograph, which is of importance in the accurate determination of altitude by the barometric method. Incidentally, this was the first altitude flight in which the above feature was used.

It may be well at this point to emphasize the importance of checking the barograph at the particular low temperature to which it was subjected at the ceiling of the flight. Neglecting this procedure and making the test with the barograph at room temperature (20°C) would introduce errors which will vary from instrument to instrument. It would make the high altitude record depend also on the choice of the barograph. For example, special tests on a barograph having an unusually small temperature effect gave a difference of 7 millimeters of mercury (equivalent to 1,000 feet) when the instrument was tested at—45°C and at 25° C with the pressure 137 millimeters of mercury (40,000 feet). The pressure reading was found to be lower when the instrument was tested at —45° C, which corresponds to a higher altitude.

In order to guard against the stopping of the clockwork at low temperatures such as are experienced in high altitude flights, the mainspring of the instrument was cleansed free from oil and a little powdered graphite was substituted,—fluxing it in between the convolutions of the mainspring by the aid of kerosene. From tests made by Mr. Fidel Cordero at the Bureau of Standards, it was found that the oil used to lubricate the mainspring became stiff enough on cooling to low temperatures, to interfere with the power supply of the clockwork. When the main-



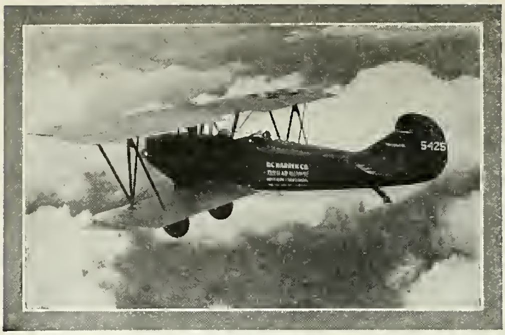
Pilot's cockpit of the Army's special altitude airplane, X-CO5A, showing some of the instruments necessary for altitude flying.

spring was cleansed, graphited, and the pivot bearings were lubricated with light oil, there was no indication of slowing up or stopping, even when the instrument was subjected for a period of more than two hours to a temperature of —35° Centigrade.

On this particular altitude flight, Lieut. Champion unfortunately had trouble with the supercharger which became overheated, making it necessary for him to land, considerably short of a record. The barograph, when tested on the following day at the Bureau of Standards, gave a minimum pressure of 261 millimeters of mercury, which is equivalent to 7,985 meters, or to 26,197 feet. The built-in thermograph, when checked against a standard thermometer, gave a minimum temperature of —4° Centigrade From the trace made by the temperature recorder it was noted incidentally, that the barograph had a considerable thermal lag. On landing, the pilot was perspiring profusely because of the excessive warmth produced by the heavy flying clothes, now that he was back again on earth in a mid-summer sun. He remarked with emphasis that his next trial would not take place until some time in mid-winter, after several adjustments had been made in the power plant of the ship.

On August 21st, at Curtiss Field, Long Island, New York, Miss Elinor Smith, 17-year-old aviatrix, in a Waco landplane powered with a Curtiss OX-5 motor of 90 horsepower, made a flight which appeared to stimulate considerable interest among other women in the art of sky climbing. The ship, according to the pilot, climbed 5,000 feet in the first 15 minutes. The altimeter soon after failed to function and further climb data could not be obtained. The plane, however, continued to climb slowly, with the air temperature dropping steadily. The flight lasted approximately two hours. Several days later when a flight-history test was made, the barograph indicated a minimum pressure of 485 millimeters of mercury, which is equivalent to 3,555 meters, or to 11,663 feet. The record, however, must be considered unofficial because the F. A. I. does not have categories for women's records. The plane, unfortunately, was too heavy to be considered in the light plane class, or this altitude record would have been considered an official one in a light plane category.

On October 10th, at Wright Field, Dayton, Ohio, Capts. St. Clair Streett and A. W. Stevens, U. S. A., made a most interesting and valuable flight. It well may be considered the feature performance of the year. The Army landplane X-CO5A, powered with a Liberty 12-cylinder motor of 400 horsepower, supercharged, was used in this epoch-making trial, the primary purpose of which was to make satisfactory photographs of the ground while at extremely high altitudes. Incidentally, a value on the "tape-line" altitude above the ground was obtained by the use of the camera. Capt. St. Clair Streett successfully piloted the ship to a new ceiling while Capt. Stevens recorded important temperature data and operated the camera. Six quarts of liquid oxygen were used. Liquid oxygen was chosen in preference to compressed oxygen gas, because the apparatus used to control the pressure of the compressed gas sometimes freezes up. The flying suits, gloves, and one pair of goggles were electrically heated. The goggles used by Capt. Stevens had two small peep holes drilled through the glasses to prevent frost from obscuring his vision. Mounted on the back of the observer's right hand within the glove was a heating coil, designed to keep the fingers warm even at the highest altitudes. The camera used was a Fairchild aerial surveying instrument fitted with a between-the-lens shutter which also was electrically heated. It was found necessary to supply heat to



Louise McPhetridge flew to 20,270 feet altitude.

the shutter of the camera in order to prevent the thin metallic leaves from shattering when operating at such low temperatures as are experienced at high altitudes. In front of the lens combination was mounted a minus blue filter prepared with optically plane surfaces. By the use of the filter it was possible to cut through haze and obtain clear photographs of the ground below. The exposures were made on 7 by 9 inch film, held flat against a glass plate that had corner index marks engraved upon it. In this way the film, after development and drying, could be checked for shrinkage, and the necessary corrections could be applied during measurements. The camera, assembled as used in flight, was first checked on the ground for effective focal length. This was done by photographing an object, such as a building whose length was known, from different measured distances. The image thus obtained on the film could be measured with care, and by a simple computation the focal length of the combination could be ascertained. During flight, most of the exposures were made from an altitude ranging from 30,000 feet to the ceiling of the flight. By skilful handling of the ship, Capt. St. Clair Streett managed to climb until the altimeter in the cockpit (uncorrected for scale and temperature errors) read 40,220 feet. This service altimeter, because of its graduation in accordance with the U. S. Calibration Standard, always reads somewhat higher than the corresponding F. A. I. altitude. The climb to the ceiling of the plane was made in one hour and twenty minutes, when, after having made the last few exposures, Capt. Stevens signalled to the pilot to descend. It was then found that the throttle had become jammed, due to the contraction caused by the low temperatures which proved to be —60° Centigrade out in the free air and —44° Centigrade within the cockpit. It was consequently necessary to incline the plane downward with the throttle wide open. Such maneuvering, of course, had to be performed with great skill and care, because of the low structural factor of safety necessarily provided in this specially designed high altitude ship. To cut the motor off the glide down to earth would mean a rapid freezing of the water in the cylinder jackets, soon resulting in a ruined motor. After considerable maneuvering, the plane was brought down to the 34,000-foot level where the free air was relatively warmer, though still —48° Centigrade, and the throttle here became movable upon the application of considerable force. At this time the ship was practically out of gas, but the motor, fortunately, would sputter now and then, enough to keep the water from freezing during a rapid descent towards the earth. By masterful handling of the ship, a safe landing was made in a field near Rushville, Indiana, about 50 miles northwest of the point of departure. Inasmuch as the ship did not return to the starting point, the F. A. I. could not have recognized the flight as an official record, even had a new altitude mark been established. This flight, however, was of such great interest that Capt. Stevens brought the two barographs to the Bureau of Standards together with photographic negatives and some unusually complete meteorological data obtained during the flight. The minimum temperature recorded within the barographs was —43° (plus and minus 3°) for each instrument. The official barograph, when checked against a standard mercurial barometer gave a minimum pressure of 152 millimeters of mercury, which is equivalent to 11,538 meters, or to 37,854 feet. This established an unofficial altitude record for two men in a plane. Of special interest in this remarkable flight was the comparison of

(*Continued on page 242*)

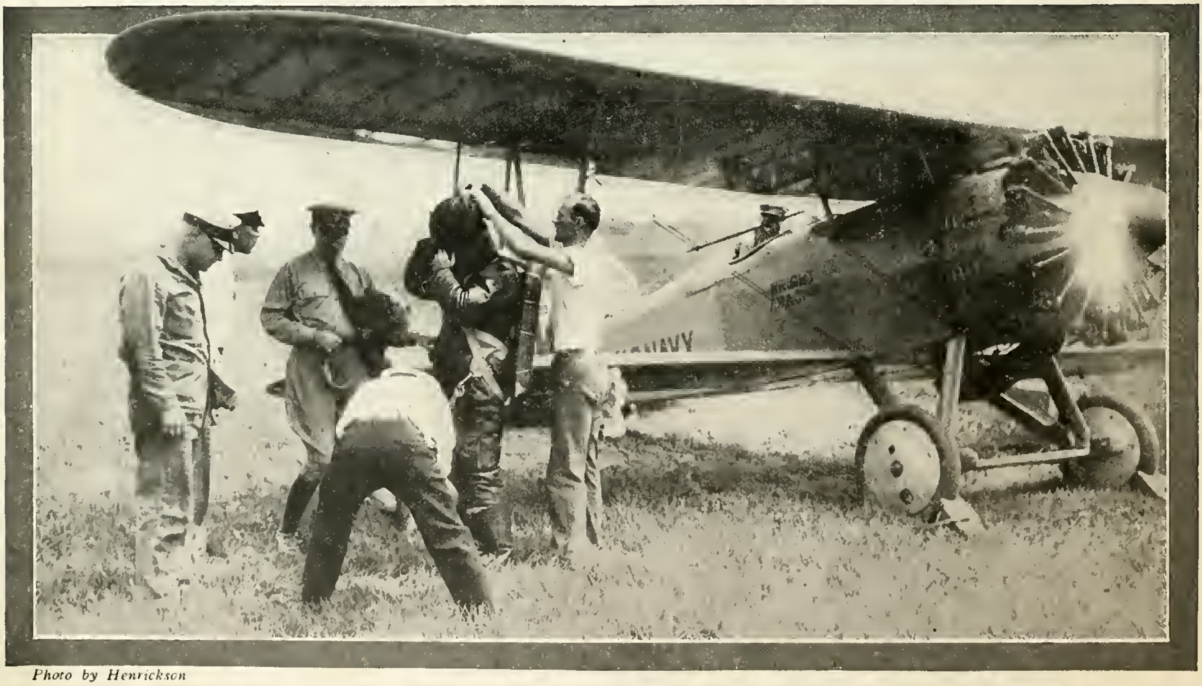


Photo by Henrickson

Lieut. C. C. Champion, U. S. N., holder of world's altitude record, prepares to exceed his old record of 38,418 feet.

THE MIAMI-PANAMA MAIL ROUTE

By James Warner Bellah

To the European, used to his city-to-city hops where the finest of airdrome facilities have existed for over a decade and to his short water jumps falling well under one hundred miles in every part of his continental territory, American flying enterprises which embrace vast distances, high mountains and three and four hundred mile water jumps with a ready confidence that turns adventure over night into regular commercial services, must come as an awe inspiring spectacle which he little understands.

Whether this sort of thing is a natural heritage or whether it is due to our comparative flying inertia of the past ten years, is hard to say. Nevertheless, the results of the enterprise exist, and as each day passes, increase in scope until they are taken as much for granted as the radio and the cheap car. But this capitalizing of adventure is writing a chapter into our history comparable to the stage coach and pony express chapters and writing it so quickly that the words are being lost and buried under the small surface of an air mail stamp.

R. J. Merritt, pilot of the Sikorsky plane at Tela, Honduras. L. Boyd, mechanic, at the engine.

As this goes to press, about 70 days have elapsed since Colonel Lindbergh, technical advisor to Pan-American Airways, flying in convoy with Raymond J. Merritt of the same company, carried the first load of mail from the Miami terminal to France Field, Panama, and return. The run was both a survey and a regular run under the new contract. How much need there was for its primary function, I was fortunately able to observe during the eight days from February 17th to 25th.

We left the terminal at Miami at 6:30 the morning of the 17th with R. J. Merritt piloting, Frank Ormsbee as copilot, L. Boyd as mechanic, and your correspondent in charge of a bundle of sandwiches and eight bottles of Coca Cola, which job was described on the ship's papers as "Navigator"—a touch of irony, discredited perhaps, by the safe arrival of the sandwiches—an art, in my balmy days, beyond the grasp of navigators.

The first stop outbound is the Havana airport (Colombia Field), where all the usual facilities are at hand. Havana behind, however, and we became a self contained unit with no complete servicing and no spare parts, besides those we carried, between us and France Field. Le Fe on the northwestern tip of Cuba was then and still is a fuel stop on a water landing—the job is the Sikorsky S-38 with an auxiliary cabin tank—where gassing is a crew proposition by hand pumps from row boats. We left Le Fe for the water hop to Yucatan at 2:35 and headed out across the Caribbean for a four hour and a half grind on top of the four air hours already chalked up.

There is between Belize, British Honduras (the next regular stop) and Le Fe an emergency gassing station on Cozumel Island off Yucatan where a runway has been put in at the town of San Miguel. In the event of rough open water, a lagoon landing may be made about six miles from the town where gas stores are also kept.

The Belize landing is water and runway, and the town is used for an overnight stop.

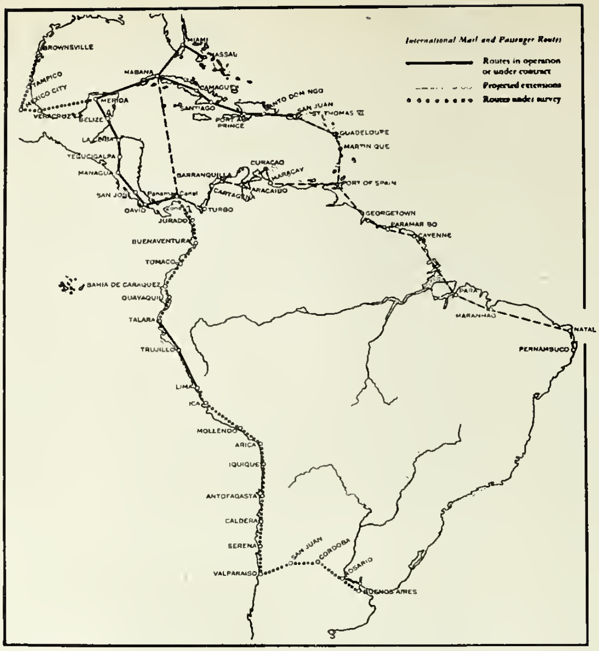
The shortest hop of the route is the next one from Belize to Tela, Honduras, approximating an hour and a half air time. At present, a semi-converted race track supplies Tela with an airdrome, and a flying taxi service maintains a hangar there.

Southbound from Tela to Managua, Nicaragua, the next stop, is the most vicious leg of the route—over volcanic mountains averaging thirteen thousand five hundred feet, absolutely devoid of railroads or even cart roads, offering no flat space even for pancaking, no telephone, no telegraph, and on the border of Honduras and Nicaragua sheltering, according to latest reports, a gentleman named Sandino who was able, some months back, to eliminate two marine pilots so completely that not a coat button or a turnbuckle has ever been located, and who has not, we have every reason to believe, subsequently lost this knack. A forced landing on this

Typical rural family, Nicaragua. Note the different racial characteristics.

leg means a crack-up of sorts, no salvage possible, and to say the least, a long walk home.

At Managua, which we made in under three hours, the regular Marine Corps landing field is utilized, and routine servicing is available. The stop in Costa Rica is made, at present, at Puntarenas on the Pacific coast, where the bay offers an excellent water landing. From Punterenas to Ciudad de David is a matter of slightly over two hours. David offers a company airdrome used jointly as an army fuel station, and the town can be utilized as an overnight stop. We came into France Field the morning of February 19th at 10:35—19 hours and 20 minutes air time out of Miami.



Map showing air routes between North and South America.

As it is put down, it sounds like almost anything. As it happened, it *was* almost anything from a Boy Scout hike to a Miami-Panama hop. If there had been anything more to report however—say a couple of fouled plugs—it would have made the front page until the next time Commissioner Whalen thought of something more to do about traffic. The outstanding fact about it was that it was a regular mail run on a regular mail schedule, flown for profit by a commercial enterprise that is in the business to make money, the fact that complete facilities were not available, notwithstanding.

There is no intimation here, however, that the enterprise went off half-cocked. Not so. The terrain to be flown over existed. Men had gone on ahead to whip what bare facilities there were into workable shape. Gas stores were established where they could be established. The best in air equipment for the problem as it presented itself was supplied. Pilot personnel was excellently chosen. When the limit of safety, compatible with the program laid down by Pa American was reached, a regular service was started. Seventy-two days ago that service was bi-monthly both down and back, and, as such, was advertised regularly in the daily papers. Today the service is tri-weekly. Planes leave Miami southbound and France Field northbound on Tuesdays, Thursdays, and Saturdays. In less than three months, so fast has the project proceeded, that the safety margin has increased by more than five hundred per cent.

At the beginning of the service, one pilot flew the whole mileage. Today, pilots are echeloned. The southbound pilots go only to Tela and return northbound after exchanging mail pouches with the (*Continued on page* 250)

San Juan del Sur, Nicaragua, from the air. Marine Corps photo taken during the recent Sandino unpleasantness.

AIR—HOT AND OTHERWISE

Detroit Does It Again—New York State and City Organize—Five Times Five

By Frank A. Tichenor

WHEN I saw last year's Detroit Air Show I thought that that enterprising city had achieved its ultimate altitude. Nobody, I reflected, could beat that, for I believed these folks had gone their final limit. But this year they have surpassed themselves again, setting a record which is entirely unprecedented. Which merely goes to show that as yet, I have not become accustomed to the Detroit spirit. Down in slow New York, where we all loaf around at a business speed of, say, a hundred miles an hour or so, we do not readily understand real speed as manifested in Detroit.

But it wasn't all Detroit at that. It was The Industry, as well. The speed of the planes it builds sets an example for the speed of its general progression. In this realm of surprises there's no telling what the next speed test, or endurance flight, or altitude endeavor may bring forth. Two very bubbly maters—Detroit and American aviation. Mix the two together and you get—you get—well, I don't mean exactly a seidlitz powder effect not in every detail, but it fizzes. You can bet your life that mixture fizzes.

The show was held in the same hall in which last year's show was held. Last year that hall could really contain it. Not this year, though. This year the Show so overflowed all available space in the building that it was not held wholly in that hall, but in the City of Detroit, and even that metropolis of Midas scarcely held it all. You know what I mean if you were out there. The Show oozed from the hall out into the highways and the byways, parked in the parks, strutted in the streets, kept the air abuzz for many miles in all directions. Exhibits were at hand from nearly all last year's exhibitors and from many others. Every public park in all Detroit, as a matter of fact, held one or more planes on show, for which the hall did not have room, and this, by the way tended to educate to matters of the air many who would not naturally have been attracted to the show, itself. We are directing Gatti-Cazzazzi's attention to it. Grand opera stars not busy at the Metropolitan on certain nights could stimulate the general high brow musical business by warbling Chinaman's Blues in Herald Square or at the Battery, or merely standing, varnished up, wherever the public could stare at them as it stood around those parked planes in Detroit, poking, now and then, to see what there is about them that enables them to fly—enables them to sing, I mean.

It would draw trade. It drew trade in Detroit.

New planes, new designs of old planes, new designs of engines, new comforts for live wire flying passengers, upholstering that would have made Mr. Rolls take notice and old man Royce bring out his notebook had they had the wit to be there, silencing devices—but why make an inventory? Clerks are hired to do that so that millionaires may study. Ships were on view which not only can make the swallow flop hopelessly, but (entirely aside from the matter of availabiliy for flight) offer to the passenger the kind of sybaritic luxury that would have made Julius Caesar retire his designers upon high pensions with eight wives each provided by the Roman Empire with instructions to be good.

Accessories undreamed of twelve short months ago were present, as if mere commonplaces, on each plane. Sleeping accommodations such as old George Pullman would have thought ambitious for his private car (which was supposed to be the finest thing on wheels) were pronounced by industrious air travellers to be better than anything supplied abroad where less wide awake air builders temperamentally specialize in such things. Two European manufacturers, who have attended all big shows since shows got big, stuttered with admiration at America's achievements when they tried to comment to me on the subject.

In point of design, production, and detailed craftsmanship exhibits were surpassing. The air industry made a nice whoopee there in Detroit—whoopee of sheer achievement and enthusiasm, which is far better than whoopee of bootleg. It took us a long time to get started in the air game, to become really air-minded, but now the certain few who thought that they could regulate the business in accordance with their own ideas of production, capital and expansion are wondering why the air is bumpy for them while others fly on smoothly. We're started, now, in spite of everybody. And boy! Watch us go.

Everybody that is anybody in the industry was out there in Detroit with plenty to see and more to do during every blessed minute of the time. All are much wiser now, for each has a whole head full of the other fellow's doings to reflect upon, and is studying how to beat him to some new progression. When the aeronautic bunch there in Detroit starts out to do something they finish the job—plus! Coöperation stuck out like a sore thumb at every angle. What a machine for real accomplishment! A whole city trained to team-work! Everyone was interested and participating, from the humblest member of the Soda Jerkers' Union to the master mind in the great aircraft factory's innermost sanctorum. Detroit quivered with air-mindedness. It spread across the river and affected Canada, her border cities being almost as excited as the Yanks; indeed, the Canadians joined in the show as happily as if it had been started by King George, with the Prince himself delivering the opening prayer.

Full of inspiring sights. Full of peppish personalities. F'rinstance there was Henry Ford with Bill Mayo, fathers of the thought that Detroit may be the "World's Air Center" because geographical position between coal and iron has made it the world's motor car manufacturing center. They were looking at their baby and were awed by it. Gee, what a kid! Edsel, of course, was with them, not quite as much impressed as they, because being of the younger generation, he has no memory of the time when all these matters would have been held witches' work. Edsel, however, is an air-minded air-apparent. He will fly high. That splendid warbird Congressman W. Frank James flew up from Washington to spend a few days examining the very latest. And it was there to see.

With all this going on we were impressed by an astounding thing. Here was Detroit, unique for enterprise, pep, wealth and other things that cheer, one of the leaders of the nation's aero-manufacturing enterprise, home of a million, and magnet for a million more, but actually *without an airport!* At the present minute it has not been able to create and carry through the impulse which would buy a field, drain it, light it and create a management for it! Somebody needs to go across (*Continued on page* 238)

RELIEF WORK BY AIRPLANE IN THE ALABAMA FLOOD

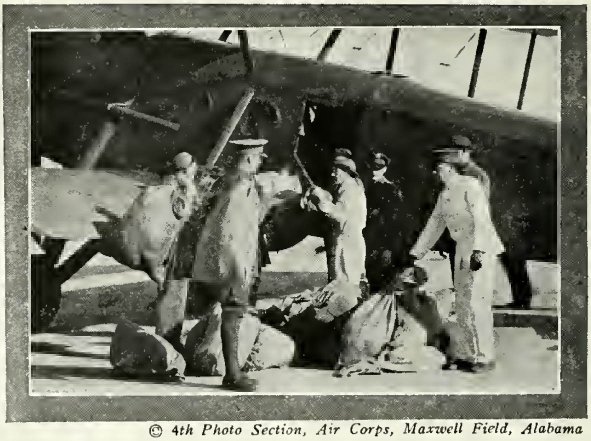
By Corrine Hardesty

WITH hundreds of thousands of acres of rich farming land inundated by the greatest spring freshet ever experienced in south central Alabama and with thousands of people homeless in rural districts and small towns, the airplane, has perhaps been the chief agent in alleviating hunger, exposure and disease and in preventing death.

During the week of March 15-22, when men, women and children were marooned on housetops and on small islands created by the overflow waters from swollen rivers, food and clothing and often medicine were dropped from planes to those overcome by privation and exposure.

The stalking spectre of such diseases as the dreaded typhoid and pneumonia in a large measure was thwarted by the quick response to calls for assistance made by members of the Army Air Corps from southern aviation centers who flew their planes from daylight to dusk in this modern mission of mercy.

Excessive rains, which broke all records for spring precipitation, fell for a week over the headwaters and tributaries of rivers flowing into the Gulf of Mexico through this section of the state. Streams were swollen far beyond all previous crests. Rich lowlands and prosperous towns inhabited by persons numbering from five hundred to twenty thousand, within a short time, were under from ten to twenty feet of reddish, muddy water. The loss of life perhaps will not be known accurately until weeks after these streams have subsided and returned to their banks; yet it is safe to say that hundreds have perished and that millions of dollars in property and live stock have been swept away.

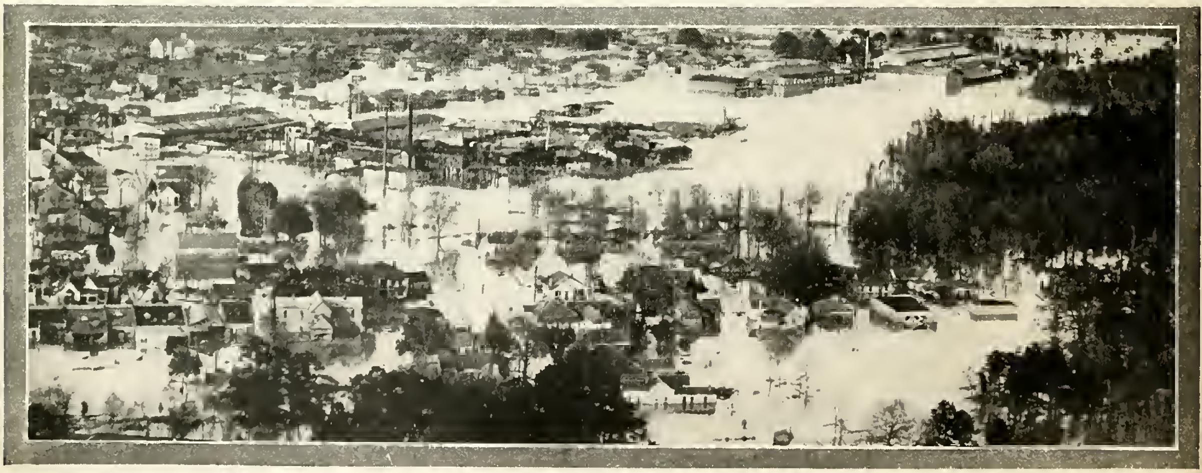

© 4th Photo Section, Air Corps, Maxwell Field, Alabama

Loading a transport with supplies for the relief of flood victims.

The principal source of aerial relief for these stricken areas was the Army Air Corps unit at Maxwell Field, Alabama, operating under the direction of the Fourth Corps Area, United States Army, which the War Department had placed at the command of Governor Bibb Graves of Alabama.

Major Walter R. Weaver, Commandant at Maxwell Field, in charge of a fleet of army planes mobilized from his own command and from Langley Field, Virginia; Fort Bragg, North Carolina; Roberts Field, Birmingham, and Fort McPherson, Georgia, immediately established airlines between relief headquarters of the State of Alabama and the American Red Cross to points within the stricken areas. The first planes sent out on the morning of March 15 distributed the panel code system of the American Red Cross to each of the towns and communities within the flooded section and dropped food supplies in the vicinity of Elba, Brewton, Enterprise and Castelberry. Tons of foodstuffs, medicines, thousands of blankets, antitoxins for disease prevention, clothing and other necessities signaled for by these waterbound people, were transported by airplane over distances of from one hundred to two hundred miles within a remarkable short space of time without so much as the passage of a spoken word.

Meanwhile radio equipment and additional supplies were transported by detachments of the Alabama National Guard, organized into relief units, to (*Continued on page* 248)


First picture of Brewton, Alabama, during the flood, photographed by 4th Photo Section, Air Corps, Maxwell Field.

CY-ZING UP THE AIR SHOW

By

Cy Caldwell

THIS is being written aboard a Universal Airlines System plane en route from Cleveland to Chicago—or it is started there, though I have no doubt that the middle of it will be typed in a Chicago hotel room, two more paragraphs in the terminal waiting room, and the end of it in another plane bound for Minneapolis. That's why my stuff frequently reads so ragged; it's written all over the map, and proves nothing beyond the fact that one man and a Corona, plus a little savage determination, can do almost any amount of injury to six patient readers—and get away with it.

Just a word about air travel before I go ahead with the real meat of this article, the Detroit Show. As I fly over Ohio and Indiana, it occurs to me that one of the chief joys of the air traveller has been overlooked: he doesn't have to look closely at the towns he passes. Consider the delight of a man bound for Chicago who learns that he doesn't have to look at Sandusky; picture his relief when he finds that Toledo is merely a blot on the distant landscape; imagine his glad cry when he learns that Goshen, Indiana, is mercifully shrouded in fog; and conjure up in your mind his state of ecstasy, ethereal bliss, or what have you, when he is told that he has passed South Bend, and never seen it!

Ah, my friends! These are the real delights of air travel. One is spared the Spearmint signs, one is no longer urged to reach for a Lucky instead of a sweet, and one may dodge at last the sweet young man in the Sparrow collar and look of charming innocence. When this fact percolates to the general public an immediate increase in passengers may be expected. I marvel that airline publicity experts have overlooked this ground for exploitation. Why not a few ads such as: "Have you shuddered at the thought of seeing Elkhart, Indiana? Then wait for a rainy day and go by plane." Or this: "What would you give to miss Norwalk, Ohio? What a difference just a few cents make!" Any airline operator who is interested in boosting passenger income may call on me for other ads—I can knock off any number at a dollar a knock, cash in advance.

But about the Aircraft Show at Detroit—the original port of entry for the material that makes the Noble Experiment so nobly experimental. I had a relative with me at this show—my Uncle Knute (pronounced Nut) Swenson Caldwell from Sweden. Uncle Knute (or Nut) spent his early boyhood around the sardine canneries and soon became passionately fond of the little fish. While other boys of his age were playing marbles or tag, Uncle Knute (or Nut) was playing with sardines. He often said that he could get more fun out of a sardine than Texas Guinan could out of a Police Commissioner Whalen. There was one sardine in particular—a small blonde one named Oscar—that was a great favorite of Uncle's. This Oscar was of a somewhat daring turn of mind, like Speed Holman, and would do almost any trick you could ask. He could do loops and rolls in the water, and even swim upside down—though Uncle said that Oscar didn't like to swim on his back for more than two minutes because it made him dizzy, in addition to dust getting in his eyes. He was getting along all right for a sardine, and probably would have amounted to something, if he hadn't got married, only he died at an early age through trying to do an outside loop. This broke Uncle Knute (or Nut) all up, and nearly drove him out of the fish business. Still, he kept bravely on, for he realized that even a sardine is not immortal—they all get canned in the end, like Peggy Joyce's husbands.

However, he cried for a week after Oscar passed on, splashing all the other sardines with his tears, which so annoyed them that they refused to play any more until Uncle got over his grief. So for his own sake, Uncle smiled again and put the little sardines through their exercises—he had taught them to do setting up exercises so they would be nimble enough to leap into the cans unaided. He had to be careful not to overwork them, for if they broke out in a sweat they'd get sore and refuse to move a fin. Temperamental things, sardines. I've known one of them to sulk for hours because another sardine stole his crumb. But Uncle Knute (or Nut) was very considerate. If he noticed a sardine getting flushed and overheated he'd tell him to drop out of line and walk a mile for a Camel. This always quieted him.

When Uncle grew up, or as far up as a man of his mentality could go, he worked in the canning factory, but still retained his early love for sardines. He still continued to play with them—he said it kept him young and was easier than golf, though smellier. He usually carried a few sardines loose in his pockets. Whenever he was feeling blue, he would take out a tin and the sardines and practice packing them in, just for fun. He tried packing them crossways and sideways and lengthways and curled up with their tails in their mouths. They looked cute that way, but took up too much room, so that method was out. Then he packed them side by side, all facing to the north end of the can. But that left air spaces at the south end, where their tails were. Well, folks, Uncle thought and thought and thought—and it was hard work for him, too. Finally, the sardines themselves solved the difficulty. One of them, a little brighter than the rest, and even brighter than Uncle Knute (or Nut)—a thin, disgusted looking sardine named Clarence (which perhaps was why he was disgusted)—this Clarence wriggled around to get his shoulders free of the two sardines next to him. In doing so, he flopped around until his head was between the tails of his little companions. He was comfortable at once, as Uncle was quick to note. The discouraged expression left Clarence's face and he even smiled in a gentle and repressed manner, like Frank Hawks, the only man to make a non-stop flight in a coon coat which he had taken from a restaurant in mistake for his own. (Incidentally, when he had completed the flight he discovered, to his surprise, that the former owner was still inside the coat. Frank had to shake him out.)

But getting back to Clarence—Uncle was overjoyed at his discovery of a new way to pack sardines, head to tail, tail to head. This saved an inch in each can, besides pleasing the sardines better. And sardines are packed that way to this day, thanks to Uncle Knute (or Nut).

Now, what I'm getting at with this story of Uncle Nut is that he, of all men, should know how to pack things into a small space. In fact, he took pride in it; nobody, he said, could squeeze things into a smaller space than he could. He kept right on saying that, and kidding himself, until I took him to the Aircraft Show and let him see what Ray Cooper had done with those airplanes. Uncle Knute broke down and suffered a mental collapse. He admitted, between sobs, that what he had done with sardines was nothing to what Ray had done

(*Continued on page* 230)

AERIAL RADIOPHONE IN USE

By Harold Crary

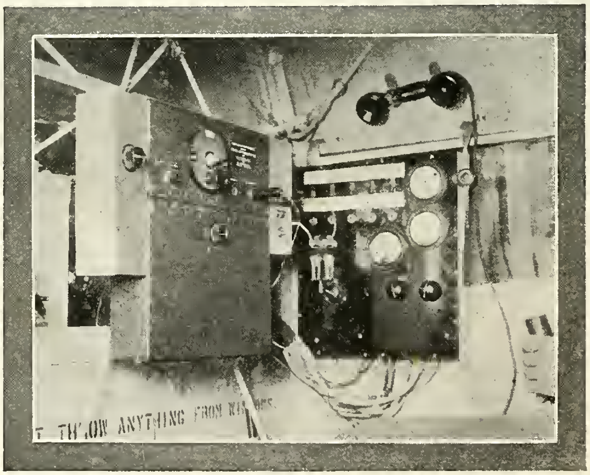
TELEPHONE communication between the pilot of a plane and the ground organization and between pilots has long been the dream of commercial aviation, but until recently, difficulties baffled every attempt to maintain voice contact with the airplane for more than a few miles.

But now, as a result of long months of experimentation and exhaustive tests made to combat difficulties encountered by changes in altitude, temperature and a changing terrain, Boeing System planes on the western division of the transcontinental route are in closer contact with headquarters than engineers on the most modern trains.

An instance reported recently is certainly conclusive evidence of this. The Boeing general offices at Seattle received a telegram stating: "Pilot Ed Allen flying transcontinental air mail Reno to Oakland in radio plane had forced landing account of engine trouble this side of Sacramento. Before landing he talked to the Oakland station and stated where he would land. His voice was heard clearly at the Oakland ground station. Pilot Ray Little flew a relief plane to the point designated by Allen and brought mail into Oakland only one hour behind schedule. Mail would have been three hours later if it had not been for the radiophone."

Ed Allen, veteran air mail pilot, with radiophone head set and transmitter

For months newspapers had known that the Boeing engineers were "getting somewhere" with an almost uncanny proposition of ground-to-plane and plane-to-plane communication, and the subject was so interesting that the Boeing companies found it difficult to ward off premature reports on its development and use. But now not only the results, but the plans for equipping the longest regularly operated airway in the world with radiophone can be told in detail.



Radiophone equipment weighing 100 pounds in the Boeing transcontinental mail plane. At the lower right is seen the pilot's hand

Some of the pertinent facts about the Boeing development and use of radiophone, which appeal most to the commercial transport operators, are: The radiophone Boeing has installed is practical, workable, and it keeps the pilot and the ground station employee in constant touch with each other. In actual operation Boeing pilots on the western division are now talking with ground stations as distant as 200 miles. The pilots are hearing the ground stations at an altitude of 12,000 feet above the ground and as high as 18,000 above sea level, and strangely enough, because of ground disturbances, the voice of the ground man comes to the pilot, and vice versa, clearer at high elevations than when near the ground.

Although the ground station equipment weighs approximately 1,500 pounds and is complicated, the radiophone equipment in the Boeing planes weighs only 100 pounds. It is stowed in the center of the mail planes and in the "tail" section of the eighteen-passenger transports.

The only mechanical electrical equipment added to Boeing planes for radiophone is a super-imposed winding on the direct current generator requiring two additional horsepower from the output of the motor.

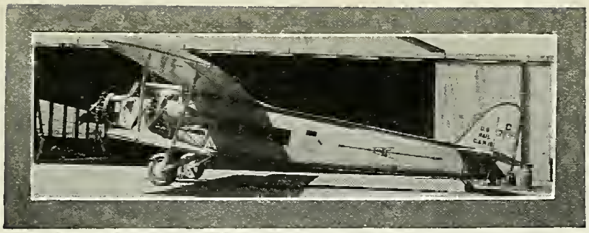
The only additional head resistance is an eight-foot dural antenna, which does away with any trailing wires and is used in both receiving and sending. The antenna is streamlined. The entire equipment is nearly automatic in operation. It requires no adjustment on the part of the pilot, who simply plugs in and talks and listens. The ground station adjusts its set to the pilot's set.

The successful operation of the radiophone on the western division of the transcontinental has been such that the installation of additional ground stations will be hurried, and within a few months, it will be possible for pilots to talk to and hear from ground stations on the entire flight of 2,000 miles between the Golden Gate and Lake Michigan, or more than half-way across the country.

Radiophone stations built or authorized by the Boeing system are at Oakland, Sacramento, Reno and Elko, Nev.; Salt Lake City, Utah; Rock Springs and Cheyenne, Wyo.; North Platte and Omaha, Nebr.; Des Moines and Iowa City, Iowa; and the Chicago municipal airport, eastern terminus of Boeing system. Additional ground stations will be at Lincoln, Nebr., and Cedar Rapids, Iowa, and later on the company will install radiophones on its Pacific Coast route. Boeing system planes now fly 7,000 to 10,000 miles daily on the transcontinental and the Los Angeles-Seattle air mail-express and passenger routes.

Ground stations will be completed and all planes equipped prior to the inauguration this summer of Boeing's expanded passenger operations with 18-passenger transports operated on a day and night flight of approximately twenty hours between Chicago and California.

Ground stations, on the transcontinental route, will be built, owned and operated by the Boeing system, under Federal supervision. Radiophones will be supplemented by the directive radio beacon signals of dots and dashes, which aid a pilot in maintaining his course, as supplied by Department of Commerce network of radio stations.

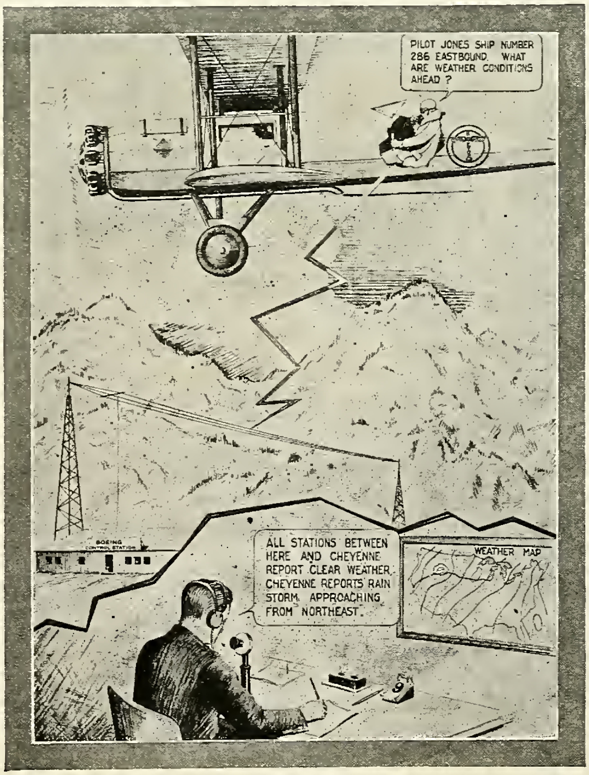


The 18-passenger trimotored Boeing Transport equipped with the 200-mile radius radiophone apparatus

Thorp Hiscock, radio engineer for the Boeing system, who, in collaboration with equipment companies, supervised the research and test work in outlining the work necessary to bring radiophone to its present usefulness, said the benefits are so apparent that the phone service can be hailed as an invention of utmost value to the development of aviation. Results of plane-to-ground and plane-to-plane telephone tests, announced after months of research, test flying and experimentation in the West, revealed these positive advantages, said Mr. Hiscock.

Radiophone on the airline adds much to the safety of flying; reduces number of emergency landings due to uncertainty as to weather ahead; enables pilots on regular routes to complete a larger number of scheduled trips on time; increases the pay load of mail-express and passenger ships by reducing the amount of excess gasoline now carried to give pilot ample cruising radius when he is uncertain as to weather. Radiophone is also of considerable value in dispatching planes and giving orders to pilots in the air.

The ground-to-plane and plane-to-plane telephone service just developed by Boeing system for the transcontinental route, called for complicated engineering in installation, but use of it by the pilot is simplicity itself.


PILOT JONES SHIP NUMBER 286 EASTBOUND. WHAT ARE WEATHER CONDITIONS AHEAD ?
BOEING CONTROL STATION
ALL STATIONS BETWEEN HERE AND CHEYENNE REPORT CLEAR WEATHER. CHEYENNE REPORTS RAIN STORM APPROACHING FROM NORTHEAST.
WEATHER MAP

An artist's sketch visualizing the practical use of the recently installed radiophone system on the Boeing airline

An example shows the method of operation: A Boeing pilot climbs into a plane equipped with a 100-pound radiophone sending and receiving set. In each ear is a cast of sponge rubber, fashioned from a mold obtained by making a cast of the pilot's ear, much as a dentist secures an impression of a tooth. This sponge fits snugly enough to remain in place without clasps or outside binding and keeps out all extraneous noises.

A fine silk cord leads from each earpiece to a plug which is put into the instrument board, on which is a switch which can be moved to "send," to talk; "receive," to listen, or "neutral," when the set is shut off.

As soon as the pilot takes off, the ground operator checks on the pilot, adjusting his mechanism to tune in with the pilot who does not adjust his set in flight. The pilot turns the switch to "receive" and waits for the periodic reports (approximately every twenty minutes), giving him the latest on the weather, wind velocity at various altitudes, dispatching, company orders and other helpful information. If he wants to talk to the ground he switches to "send."

Distance range of transmitters in planes and at stations is about 200 miles, and when that distance away from the ground station last passed, the pilot picks up the next ground station ahead and so on during the 2,000-mile flight between Chicago and San Francisco Bay. In flight, the Boeing System device is set to "receive" all the time the pilot does not want to call, and at "neutral" only when the plane is on the ground. No extra pilot or helper is required to operate the radiophone, although 18-passenger Boeing transports have a pilot and flight engineer, who can also fly the plane.

The big Boeing trimotored 18-passenger transcontinental transports and the single-engined mail plane have a large generator and engineers drew largely on the existing electric energy. There are three sources of electric energy on the Boeing planes with radiophone in operation: (1) the ignition magnetos, which, with the spark gaps of the firing plugs in the cylinders, form a source of powerful wave impulses which must be shielded; (2) a direct current, engine-driven generator for the ship's normal lighting system and starter; (3) a 1,000-volt current for the transmitter. The first has been provided for by Boeing engineers.

Currents 2 and 3 are generated by dual windings on the one armature. So the only mechanical electrical equipment added to the plane for radiophone is the superimposed winding on the direct current generator. This requires about two additional horsepower from the output of the motor. A wind-driven generator is being used at present as an auxiliary to the regular motor-driven generator, but it probably will not be standard equipment.

In addition to the three mechanical sources of electrical energy there are "B" and "C" batteries, dry cells for the receiving set.

The Boeing transport power plant also furnishes current for 25 electric lights, including the dome lights above the reclining chairs provided for passengers, lights on the wings and tail, and for the retractable "headlights" used when landing at night.

(*Continued on page* 236)

PEACE AND ITS PRICE

By Don Rose

THERE is no thing like a discussion of peace to stir up a fight. It is possible, in fact, that the nations of the world have lately come closer to war as a consequence of the discussion of peace than at any time since the last general unpleasantness. The old and familiar clouds of suspicion, distrust and fear have appeared again like bogeys above the tables whereat nations have met to outlaw war.

The same potential pugnacity has percolated downward to the lower levels, and set us all at loggerheads as to what might be done and should be done to prevent the misery and messiness of war from spoiling the world for another generation. Everybody agrees that something should be done about it, but you may pick up in any smoking car a dozen different suggestions as to what that something should be. Also you can discover pretty strong evidence that ignorance on the matter increases as the square of the distance, and that the man who has the solution all wrapped up ready for delivery to the League of Nations hasn't one-half of one per cent of an idea of what is involved in providing peace on earth and guaranteeing goodwill among men. Usually his solution is as simple as that proposed for preventing fatal accidents on railroads and subways. An observant individual noted that in collisions, the rear car was almost always the scene of the casualties. He therefore proposed that the rear car be left off of trains and subways, so that there would be no more such accidents.

There is the same sort of ingenuous optimism in most of the half-baked schemes and formulas offered by amateur pacifists. Particularly it appears in the idea that disarmament is a universal remedy for all the international diseases that are likely to break out in war. The sweetly simple idea is that if nobody has a gun, nobody can shoot. Therefore, say the pacifists, let us be done with army and navy and all else that might be handy in a fight, and trust the kindness of the rest of the world and our own good luck to provide that nobody catches us with our pants down.

Those of us who have an air-minded conscience have no business to be ducking away from this disarmament discussion. It concerns us not only because we are as zealous for peace as the next fellow, but because the business and military aspects of aviation are so much entangled that no one can entirely get them apart. The whole-hog theory of disarmament is aimed specifically at war, but aviation in general is also in the line of fire. And furthermore, since war—bad as it is—usually gets its spark from the clash of ambitions and conflicting aims on the frontiers of progress, the most typically progressive business in the world of today must take care to know its way about in this discussion.

The theory of disarmament is perfectly simple to anybody who knows nothing about it. It is based on a parable of two Irishmen, each with a brick in his hand. As long as each has a brick, either of them may throw the brick. If, on the other hand, they both lay down their brick, no bricks will be thrown. That is disarmament, and the result is peace.

But let us examine the parable. After the bricks are laid down or tossed away, a very interesting question arises. Which of the two Irishmen could reach his brick again the quickest, supposing any unpleasantness arose which seemed to call for bricks? Did one of them deliberately lay down his brick in such a way that he could get it again a split second in advance of the other party? Or is it possible that one of them has another brick concealed somewhere in the slack of his trousers? Maybe this is not such a peaceful picture after all.

But that's not the whole of it. Suppose, for instance, that one of the Irishmen is a bricklayer. In that case he has a perfect right to have a fistful of brick. The other gentleman, however, is a paperhanger, and what is he doing with a brick? The bricklaying Irishman suggests that the paperhanger lay down the brick, since he obviously has no real use for a brick and may be tempted to start something with it. The paperhanger replies that he was just playing with the brick or is saving it for a bad-tempered dog or is thinking of building a doorstep with it. He says it is a very peaceful brick, and he doesn't care to lay it down. Obviously we aren't getting anywhere.

But the thing gets more complicated every minute. Down the road comes a small boy, and he also has a brick. Now it is perfectly clear that no small boy has a brick with any good intentions, and one Irishman immediately proposes to take it away from him. But the other Irishman is his uncle, and won't stand for it. Just then a third Irishman turns up and takes the small boy's brick away, and now you have three Irishmen and three bricks and almost anything can happen.

To disarm these three Irishmen and all their friends, relatives and neighbors is a ridiculously simple matter compared to the disarmament of the nations of the world. The reason that disarmament moves so slowly is that, with the best intentions imaginable, the nations find it an enormously difficult problem. In the first place, the world is clearly not peacefully inclined. There are sore spots all over it, and there are just as many possibilities of grievance between nations as between me and my neighbors. And wherever there are the making of an argument, somebody will be looking for a brick.

Further, hardly anybody has any idea what disarmament means anyhow. Some nations are clearly entitled to armament for the protection of their people and commerce, while others with the same equipment would be grossly overarmed. Some can get along with small armaments, because their manufacturing capacities could quickly increase this armament to an enormous scale. Some have friendly neighbors; some have geographical advantages; some have a quick draw on the trigger and a natural aptitude for a fight. There has never been a genius in the history of the world who could work out a scheme which would leave all the nations equally unprepared for war, equally pledged to peace, equally ready to live and let live. Any theory of disarmament that is barking up that tree is wasting its breath and our time.

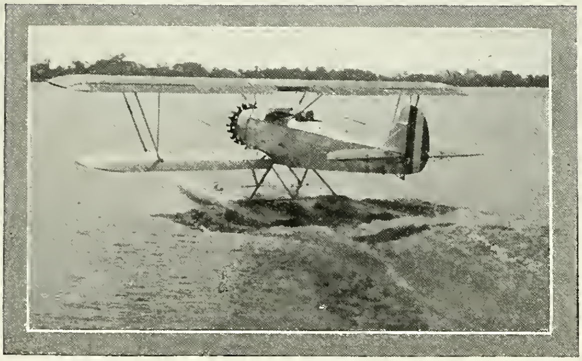
There is, of course, plenty of good sense in the disarmament campaign but it hasn't much to do with the prevention of war. It is principally a matter of sensible economy. It has been expertly estimated that the annual armament budgets of the so-called civilized world total 3,856 million dollars, and that the military expenses of the members of the League of Nations for a single year would pay all the expenses of that organization for six centuries. If there is any way to cut down on this perfectly asinine total, it's a good idea and everybody is for it. But it won't prevent war for two minutes.

The real armament problem of today is the question as to how much is necessary and how much is too much, and that is a pie in which aviation

(*Continued on page 224*)

WATER HANDLING OF SEAPLANES AND FLYING BOATS

By Lieut. George B. Post, U. S. N. R.
Vice President, Edo Aircraft Corp.



Keystone "Pronto" ploughing along at good taxiing speed.

When loaded to the same total weight, a seaplane can hardly be distinguished from a landplane, in so far as handling in the air is concerned. Occasionally a pilot will assert that the seaplane controls are a little slower to respond, and will blame the change on the pontoons which are attached beneath him; but though theoretically correct, he is not borne out by practical experience, and a psychological reaction is usually the basis for the change of "feel" he describes. A slight increase in stability can usually be observed, due to the lowering of the center of gravity of the machine, and it is frequently felt that a plane on floats will spin more slowly and with less regular motion than it displays on wheels. In general, however, it may fairly be said that seaplanes and landplanes fly alike, including stunting and all maneuvers, and anyone who is familiar with a ship on wheels will feel perfectly at home when he takes it out on floats.

There is a difference, however, between taxiing on land and on water, and although a few suggestions and some good common sense are all the guidance a landplane pilot requires, he does well to think the principles over before trying it out for the first time.

Before going into the subject at length, it may be well to define a few general terms which will be frequently used hereafter: a seaplane is said to "weathercock" or tend to head into the wind. The action is caused by the fact that the rudder and end of the fuselage are considerably behind the floats, and when drifting, or free to swing, the ship will naturally act like a weathervane and line itself up with the wind. The same principle is sometimes felt in a landplane when taxiing on hard ground or concrete, in a strong crosswind, although the tail skid makes the action much less pronounced than it is on floats. Weathercock action is of the greatest importance in taxiing a seaplane. Its effects are second nature to a man who has sailed boats and lived on the water, but are sometimes the source of no end of trouble to the person who but vaguely knows what it means.

The "step" of a seaplane float is the jog in the bottom which is seen in a side view. In normal practice it is slightly behind the center of gravity. A seaplane is said to be "planing" or "on the step" when it is traveling at sufficient speed to be lifted close to the surface of the water, which appears to flow out in comparatively straight lines behind the step instead of clinging to the rear portion of the float, as it would at slower speed. The average seaplane goes "on the step" at about 25 miles per hour. Under these conditions the pontoon is being partially supported by the lift of its bottom and is not displacing its own weight, as it would at rest.

A seaplane is said to "rock" or "porpoise" when it alternately plunges up and down along the surface of the water. "Porpoising" can only take place while "on the step," and should immediately be checked by the elevator control. It can always be stopped through reduction of speed by throttling the motor. It is usually started by wave action, particularly when taxiing "on the step" down wind.

As a general rule it is advisable to taxi a seaplane as slowly as possible, consistent with maintaining adequate rudder control. A fair average would be 10-15 miles per hour, or well under half throttle. Under these conditions the floats are plowing along through the water and the controls should be held all the way back to keep the nose of the pontoons up and reduce spray on the propeller. Furthermore, the plane can be turned more easily in this condition, since there is not so much length of the float in the water.

If any wind is blowing, it must be remembered that the

A Waco-10 running free and in perfect planing position, in a climbing turn, and coming in for a fast landing.

plane, if left to itself, will always tend to weathercock *into* the wind, unless it happens to be heading with the wind *exactly on its tail,* in which case it may travel for some time, without tending to turn in *either* direction. When turning *away* from the wind, apply rudder and *as much power* as may be required. When turning *into* the wind, apply rudder and *throttle the motor.* When a turn is to be made when running *exactly* with the wind, apply rudder and a short burst of power until the turn is started; then immediately throttle the motor. It may seem strange, but a much shorter turn *into* the wind can be made without power than with it.

If it is necessary to run a course directly down wind, it is advisable to use considerable power, to be sure of keeping adequate rudder control. If speed must be reduced and the engine throttled, remember that the wind will then be blowing from the rear, faster than the plane is moving and that while in this condition, *all controls are reversed.* It is at best a tricky situation to get into, however, since the plane is likely to start turning one way or the other, and once started will require considerable power to bring it back. If possible, it is much better to choose a course on a diagonal, one way or the other.

An alternate suggestion for handling the problem of a down wind course is worthy of consideration, if the wind is unusually strong and the distance to be covered is not too great. The plane can be headed into the wind and the motor throttled to the lowest idling speed, so that the ship will actually be blown *backward* along the desired course. Working the rudder and swinging the plane off the wind, so that it will tack like a sail boat from one course to another, will speed up the backward draft if desired, and if there is plenty of room and no need for the motor at the last moment, the switches can be cut and the drift still further accelerated.

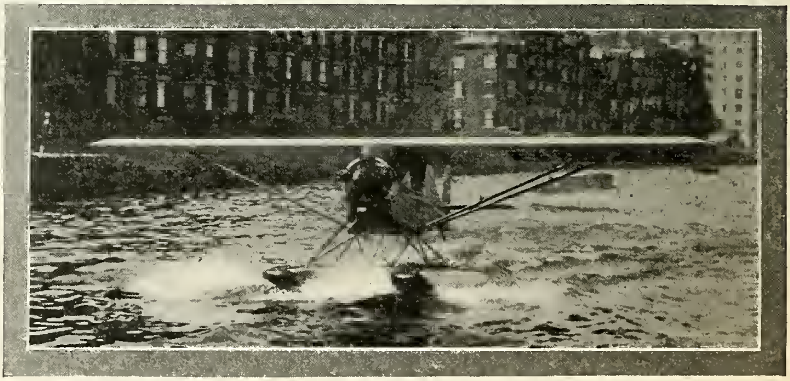
When a course is to be covered with a strong side wind, it is advisable to use full rudder and just sufficient power to hold steadily on it. The pilot will then always know that more power will force him *away* from the wind, while less power and rudder will always bring him *into* it, and if there are obstacles near and any danger of collision, it is always important to know which way the plane will turn, and exactly what it will do if the switches must be cut. A little practice will quickly show how much weathercock there is to contend with and how much allowance must be made under any particular conditions.

In taking a seaplane off, the pilot should open the throttle wide and hold the controls back, usually as far as they will go. The nose, of course, immediately lifts and the ship tends to climb up out of the water. If the ship is light and peppy, a second or two of up elevator is sufficient. The controls should then be eased forward and the plane will immediately climb onto "the step," and a few seconds later will have gained sufficient speed to be pulled off the water. A five to ten second take-off would be correctly handled in this manner.

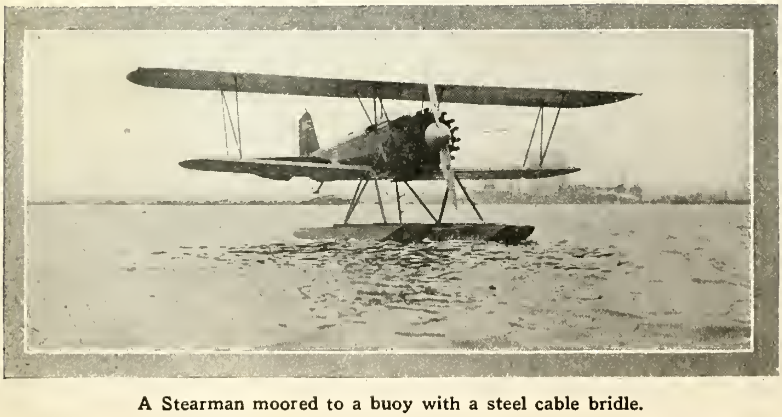
If the ship is heavily loaded, however, the controls must be held back considerably longer, until the plane appears to have climbed out as far as it will go in this condition. The controls are then put all the way forward, which tends to lift up the stern of the floats and force the plane up on the step. If the plane is very much overloaded, it may refuse to come up at first, and in this case it will prove helpful to rock the controls back and forth in an effort to porpoise it.

The speed will noticeably increase as the floats commence to plane, and the controls should then be gradually eased back to a more or less neutral point to allow the ship freely to run along on the step and pick up as much speed as possible. When maximum speed is reached, the controls are pulled back and the ship is lifted into the air.

It is interesting to note that in taking off a seaplane the controls are first pulled back, and that after that, they are handled exactly as they would be if the ship were on wheels. The original movement is simply to cut down the spray on the propeller and lift up the nose, since down elevator at the start would tend to bury the nose and make it very hard to reach a planing position. After the nose is well up, it simply is the land maneuver of getting the tail up and holding it there for awhile to pick up speed and finally pulling it off. Rough water will feel exactly like a rough field, and if a wave should bounce the ship off before it is ready to fly, it should be held off as long as possible, stalled back on the water, and nursed along with easy controls until flying speed is finally attained. Glassy smooth water presents the only difference whatever, since if there are no waves at all to break the suction, the floats may tend to stick fast in a planing position and



Velie Monocoupe in the Charles River Basin, Boston, Massachusetts.

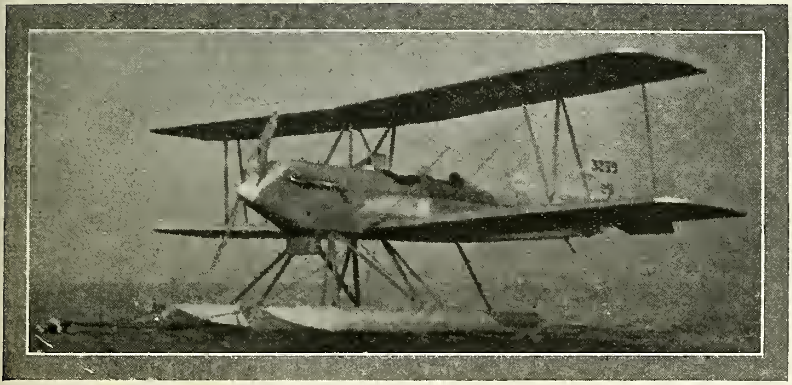


A Stearman moored to a buoy with a steel cable bridle.

the controls will then have to be pulled sharply back to press the tail down enough to break them loose.

The combination of little or no wind, smooth surface water and a large heavy ground swell, such as is often found in summer in the open ocean, presents what is probably the most difficult problem in taking off a seaplane or flying boat; and calls for a special technique which would not otherwise be required. Until planing speed is reached, it does not make any particular difference in what direction the ship is headed with reference to the swells. If any appreciable wind is present, however, it will probably be wise to head into it until the plane is partially on the step. In any event, as soon as a planing condition is approached, it is imperative to head the plane parallel to the swells, taking care to run along a crest rather than in the trough, and the ship must be held in this direction until it can be pulled off the water. It is a difficult maneuver, and is recommended only to experienced pilots for emergency use, since it is obvious that if the plane should be allowed to strike a 15 or 20 foot swell head on, at anything like flying speed, it would unquestionably result in disaster. Naturally a landing would be made parallel to and on the crest of a swell in the same manner, due allowances being made for the drift of a side wind, if any exists.

Ryan Brougham running at high speed and about to leave the water.


An OX-5 Eaglerock properly moored with a rope bridle to a buoy.

A seaplane is landed exactly like a ship on wheels, except that it can be bungled a lot more without making any noticeable difference. Probably the theoretically correct landing is to touch the step and the tail of the floats at the same instant, but a very much steeper stall can be made on the extreme end of the floats and is actually desirable in very rough weather, so as to reach the lowest possible speed. It is not recommended for ordinary use, however, because of the unusual strains that are placed on the fuselage and landing gear struts. If the water is smooth, it is good sport to make speed landings on the step and hold the controls slightly forward immediately after touching the water to keep the plane from kissing off again. Abnormally fast landings should also be avoided, however, since they put excessive suction strains on the bottom and have been known to actually suck off a plank in the old wooden type of flying boat.

Generally speaking, it is easier to land a seaplane than a landplane because of the fact that there is usually more room, and the extreme accuracy of a spot landing is seldom, if ever, required. In the case of the experimental flying of planes with high landing speeds, this feature is sometimes of great advantage, particularly when the machine is found to be in improper balance. The fact that the fuselage is usually higher in a seaplane than it is in a landplane, is probably the only point which a pilot need bear in mind in making his first landing on floats; but the practice of coming in fast, leveling off fairly high, and gradually settling into the water is entirely permissible where plenty of room is available, and will quickly and safely adjust him to the changed condition.

The technique of bringing a seaplane to a buoy or float is a frequent source of apprehension and occasionally difficult to the inexperienced pilot, unless he is fortunate enough to have a nautical background and is familiar with sailing and small boats. A little thought and a common sense application of the general theory of taxiing, which has previously been described, however, should fully answer all his requirements.

Obviously, it is wise to come up to the landing as slowly as possible, and for this reason, the approach should always be made directly into the wind. If possible, it is advisable to do all necessary maneuvering at a considerable distance down wind from the objective, so that a direct into-the-wind course can be followed and the pilot's attention need not be distracted by the necessity for sudden turns at the last moment. The engine should be throttled down to the limit, unless a strong head wind demands a certain amount of power, and if the idling adjustment is too fast, it is often wise to retard the spark and, if necessary, blimp the engine down still more with the switches.

In picking up a buoy, it is best to have a passenger climb down on the flat deck of one of the floats and stand by with a short length of line—one end of which has already been temporarily secured to a cleat or strut. It is convenient to have a snap hook in the other end of the line, which fits the eye in the buoy. The plane should be taxied slightly to the right or left of the mooring, so that one of the floats will be brought directly alongside it within easy reach, and as soon as the line is made fast, the switches are immediately cut. The permanent mooring lines can then be arranged at leisure, and a bridle running from the base of the

(*Continued on page 258*)

ORGANIZED RECREATION AT FLYING SCHOOLS

By

Carl R. Anderson

Director of Athletics, Embry-Riddle Co.

THE young men and women who come to a flying school these days are energetic and modern. The great majority of them have already been through academic schools and are familiar with sports of many descriptions. Because they are energetic, and because they have come from active athletic lives either in clubs or schools, their physical well-being demands attention. Supervised sports and recreation provide sufficient activity to keep these students entertained in the spare time between classes and flying instruction periods.

Not only is a program of recreation necessary in the modern flying school, but its benefits may be made so pronounced as to make such a program a valuable adjunct to training.

No flying school of standing (that is, a school that is seriously engaged in training pilots for the profession instead of collecting a few hundred dollars for "teaching people to fly") can afford to disregard the problem of what to do with students during the "off" hours. Certainly when a school has reached a stage where 25 or 50 students are always at the field awaiting their time for instruction, supervised playing for their students becomes important.

It is conceivable (and who can say it is not probable?) that students of the future, desiring to learn to fly, will follow much the same plan that high school students use in selecting their college alma maters today. It may not be the proper way to do it, but the embryo flier of the future might want to attend a school that is noted for its sports program, its winning teams, or its ideal location for the greatest number of types of recreation. Other things being equal, the school with the best reputation in this direction will hold a greater appeal in the student. Fliers tell me there will always be flying schools. Personally, I know we will always have sports and organized recreation. The two combine easily.

The Embry-Riddle basketball team.

The Department of Commerce wisely requires a certain physical examination for pilots' licenses. When an applicant reaches the point where he wants a transport license, the physical examination is very strict. That is as it should be. The pilot of a passenger plane often has valuable lives depending on his ability to handle his plane in every circumstance. He should be physically fit for every emergency.

It will not be possible to take a student who is physically not qualified as transport pilot material and build him up to a perfect physical condition during his course of training. He rarely spends more than six months in the flying school, and this is too short a time to effect any great improvement, unless a rigid and perfect disciplinary training is forced on him. This is not always possible in the case of the flying school student, who is not eager to submit to tedious training. Nevertheless, we can arrange a program of recreation that will be physically helpful, and presenting this under the guise of play, develop such of the physical characteristics as will be of value to a pilot.

Within the next two years, I believe, every large school will have its own personnel specially assigned to this one task. The case of the Embry-Riddle Company is typical. Out of a somewhat haphazard program of recreation during 1928, the company has developed a definite policy for 1929, even to hiring a specialist in this one branch of the work. While I am assigned primarily to work in the traffic division of the company under Floyd S. Prothero, the traffic manager, my secondary job during the winter was to prepare this program.

We are now considering certain definite forms of athletics that are especially adapted to the use of the flying school student. In so doing, we must recognize that he needs to develop quick judgment, a cool and calculating temperament, and a perfect coördination between decision and action. Some games minister exactly and specifically to these needs.

Winter games of this character are headed, I believe, by basketball. Hockey is good, except at those schools which are fortunate enough to be located far enough south to avoid ice, and be able to operate throughout the winter. I consider basketball more beneficial even than hockey. It develops quick vision, judgment in distances, and the ability to make cool decisions. The Embry-Riddle squad is at present composed of eight members of the company and four students. Two of the students are regulars. Where equipment and space are available, I should strongly urge a program of basketball games between student teams. It is true these teams would change rapidly with graduations, etc., but the benefits of the game could be shared by participants even in the comparatively short time the student is at flying school.

Baseball and football present the same handicaps. Baseball probably would serve a greater number of students, and because of the nature of the game, it adapts itself to whole teams, or half teams. It develops the same qualities that are needed by the student who is learning to fly. Judgment is stressed particularly in baseball and basketball.

Leaving the group games and considering those in which a few can take part, we find a greater range for the flying school program. There are many contests in which two or four students can play, and nearly all of them contribute something to the needs of the embryo flier.

I believe I would head the list with fencing. This sport is not widely engaged in, but its adaption to the needs of the flier is apparent at first glance. Balance, judgment and quick movement are developed in the fencer. The one outstanding feature of this form of recreation is that any two students may engage in it. Baseball, football and tennis may be interrupted when players have to report for instruction, but a good fencing tournament can be continued almost all day long with various opponents stepping in.

Boxing is in almost the same category. It is a different type of game and probably would not appeal to the wide range of students who would like fencing. Boxing will likewise develop quick actions and coolness, but generally it does not measure up with basketball and fencing in its contribution to a student's training.

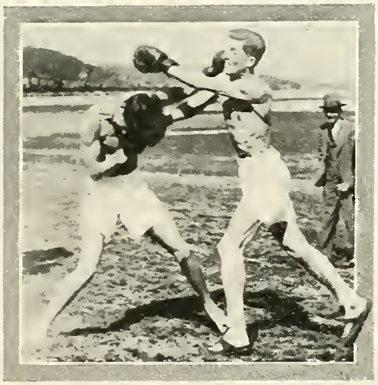
Tennis is of course an ideal game for the student, and there should be little difficulty in working a tennis tournament into the program of a flying school. Since most young men already are acquainted with the game, the school would face only the problem of laying out a court for play, accessible to the students.

The Army Air Corps training schools recognize the importance of trap and target shooting for the flying school student. At Kelly Field, every cadet is required to fire about three hundred rounds in clay pigeon shooting. Trap shooting should be a part of the student's recreation. Because of the open nature of flying fields, and the prevailing situation of open acres about them, there should be little difficulty in layout of the traps. Clay pigeons cost but little, and many students could furnish their own guns and ammunition.

A rifle range and pistol butts present more serious problems, but there are usually some locations about the average field, where these could safely be installed.

Horse-shoe pitching or quoits will find their adherents in any group of students. These sports always develop some of the qualities of the good pilot. There is virtually no expense connected with installing these games.

A game that is winning converts in the athletic clubs, and which lends itself admirably to the fliers' recreation program is shuttlecock. This game, together with tennis and volley ball can be played on the same court. Shuttlecock calls for inexpensive equipment, and enables two or four to keep themselves entertained.



Handball, while it does contribute somewhat to the flier's ability, presents a different problem because of the need of a special court.

One other game which calls for the physical characteristics which make for a good pilot, is archery. The equipment here is not expensive either, and this game has the added advantage of being in vogue. In a very short time, this game has recently built up a tremendous following. It combines a need for skill, strength, steady nerves and a sharp eye that should be developed in every young pilot. It should not interfere at all with the flying schedule of any school.

There are many other games and sports that make for all round health, and these are valuable in proportion to the amount of time that students can spend on them. Swimming is invaluable for general health building and should be encouraged in the young pilot. Polo is healthful, but expensive. Golf takes the student away from the field. The latter two are beneficial but somewhat impractical for the flying students.

Because the pilot must always be alert and ready to bring into action all his faculties and physical resources; because he must develop (*Continued on page* 246)

Typical sports at the Embry-Riddle Flying School.

AERONAUTIC BUSINESS TRAINING

By
Alex M. Robson
Director of Aviation Business Courses
Universal Aviation Schools

THE average new industry in the past usually suffered from lack of capital. Money always stood in the way of expansion. In the aviation industry exactly the opposite conditions are found. Today money to promote airlines is over-subscribed. The necessary aircraft equipment, airport facilities and working personnel are years behind the working capital.

The greatest impediment to the progress of aviation is the lack of trained personnel. The past eighteen months have been devoted chiefly to the training of employees. It has been costly training. There has been no precedent to guide employees and employers. Problems have had to be solved as they came up. Mistakes have naturally been made, and much time and money have been lost in correcting them. This is largely because there have been so few who knew enough about management to direct the managing end of aviation.

In the past, three general classes of employment in the aircraft industry were thought to require special training—engineers, mechanics, and pilots. Not so very long ago it was thought that a man having this special training was capable of directing all phases of the aviation industry. Being a pilot was a sufficient qualification for president, operation and traffic manager, or advertising and publicity agent for a newly formed air transport company. The pilot was all in all.

Today big business has outgrown this condition. The industry requires men capable of filling positions in an executive capacity. New departments are being opened which require managing personnel. The industry can be said to be suffering with growing pains—pains for the want of trained administrators in aviation. Today the aviation executive must have executive ability plus a thorough familiarity with the conditions peculiar and specific to aviation. Being a pilot is not in itself a sufficient qualification to entitle a man to a position as a director of the business affairs of the industry.

Obviously, few men are available who have this dual training. Aviation must borrow from other fields. But the men from these other fields must have an aeronautical training.

Consider for a moment the positions that are opening every day in an air transportation company. There is the traffic department with its manager and his assistants. There is the passenger agents, the personal solicitation representatives and the traveling agents. There is the bookkeeping department with its accountants, cashiers, bookkeepers and stenographic staff. There is the operation department with its operation manager, field manager and clerks. The advertising, publicity, statistical, airplane sales, parts and service departments all require trained personnel. And then where there are school departments, there is necessarily a director, sales manager, his assistant, salesmen, registrar and clerical staff. In aviation activities other than transportation, there are positions open in such lines as in the manufacture and sale of aircraft, engines, accessories, etc. What the future may hold is only something at which we can guess.

An aviation business class in session

The man who is familiar with traffic problems as encountered in railroad transportation and who can obtain training to give him the knowledge of the inside workings of aviation, is certainly equipped to do a better job of air traffic direction than the man who has had no practical experience in handling traffic but who may be thoroughly familiar with aviation activities. Let us cite one instance:

Late in the year of 1928 a young man entered the traffic department of an aviation corporation. His application for the position showed several years' experience in a railroad passenger ticket office. He was employed because of this experience. While with the firm he sized up the air travel situation and particularly the needs of a modern system for tickets, rules and regulations. Based on his railroad experience, he applied what he had learned to the problems of the aviation company and formulated certain plans which he presented to the company officials. His plans were adopted. Because of his past experience, this man quickly arose to a position as general traffic manager.

It might be interesting to cite one more similar success. A lawyer determined to "bust" into aviation. He gave up a fair legal practice. His ability enabled him to create a position for himself as legal adviser in a large air transportation company. During the first six months of his connection with the company, he worked incessantly as an assistant in almost every capacity to learn, at first hand, the whys and wherefores of aviation. Today he enjoys an important position in the affairs of the company.

Similar short stories of how different men have made good in aviation are sufficiently numerous to fill volumes. Yet, aviation is merely an infant industry. It is difficult to conceive of the multitude of positions opening to the young man of today.

The aviation business courses at aeronautical schools such as that given in Universal Aviation Schools should do much to alleviate the need for aviation business experts. They ought to consist of a series of lectures on such subjects as follows:

Passenger solicitations; tickets, tariff and schedules; advertising and newspaper publicity; aviation insurance; aeronautical industry; operations maintenance and repair; aeronautical meteorology; air mail contracts; air commerce regulations; applied aeronautics; navigation, instruments and radio.

These subjects should be (*Continued on page* 252)

AERO DIGEST

Published Monthly
THE AERONAUTICAL DIGEST PUBLISHING CORPORATION
220 WEST 42nd STREET
NEW YORK

Vol. 14 MAY, 1929 No. 5

MORE PROGRESS

MILEAGE of American air routes increases literally by leaps and bounds and passenger carrying keeps full pace. The one has doubled and the other quadrupled in twelve months. Consider the inspiring figures: 10,472,024 miles and 52,934 passengers. Both will be quadrupled during the next year—and perhaps more. Use of the Air Mail is growing like Jack's beanstalk, with a trebling for the year to 3,632,000 pounds. We now have 15,128 miles of developed airways, of which two-thirds are lighted for night flying. The year saw the establishment of twenty-three new passenger lines, totalling in flying length 6,451 miles and covering a real territory larger by at least a quarter than similar railway mileage possibly could cover, for air lines run straight.

These goods are domestic. We also have a fine stock of foreign fabrics on our Airway counters. There is, for instance, the new air route from Brownsville, Texas, to Mexico City, the new air route from Miami to Panama, and the "circular" flight starting and returning to the same Florida City, embracing in its course, all important ports of the West Indies. And these things are but starters. Very soon we shall have developed air routes along both sides of South America and across, to meet each other down where civilization ends, converging in the North in the Canal Zone, and there connecting with airlines to Miami and the West Indies.

Intelligent cities and super-intelligent towns are establishing airports throughout the country. We have not yet caught up with Europe in such matters, but soon we shall have passed her—if we all keep pushing forward on the throttle.

Representative Kelly, that mentally efficient Pennsylvanian, assures Congress that by 1933 one-tenth of the mail will be carried by airplanes, and, we believe, 5 years will see a greater growth than that. As to freight, to mention only the Ford planes, that company's ships bore 1,663,120 pounds by air in 1928, having flown 1,050,175 miles since 1925.

FAKES

THE Better Business Bureau, of New York, issues a warning bulletin to its members directing their attention to the fact that a so-called "Volunteer Air Service" scheme, which advertised extensively that it would give courses of instruction and insignia to those who sent small sums to it, has discontinued operations at the request of the Post Office. We use the word "request" because of our natural politeness.

Every possible variety of faker turns up, soon or late, in connection with every possible business. While businesses are still haloed with novelty these crooked stunts are numerous. The motion picture business in its early years was a great victim. The crooks are working hard in these days to pilfer something out of the whole nation's growing aeronautical enthusiasm. A trip aloft and then an involuntary spill without benefit of parachute or clergy would be poetic justice for these gentry, but would be a violation of the Volstead or some other Act. Lacking Congressional authority for procedure of that sort, everyone connected with the aeronautical industry is duty-bound to expose each case of this that can be ferreted out and see to it that the crook is punished as severely as may be. Aeronautics is the cleanest game on earth. There is no room in it for swindlers. Kick them out!

COMPARATIVE NEWS VALUE

WE admire, indeed revere, the *New York Times.* Without it, life would be a dreary waste. It has genius plus horse sense, plus decency, plus Americanism, plus splendid journalistic judgment which impels it to give reasonable space to the nation's air activities. It has perhaps helped aviation more than any other newspaper in the United States.

But now and then even the *Times* slips into the popular error of feeling that an air accident is the worst accident of all, that a human being killed in an air crash is deader than one killed in any other way, and that all air accidents should be "played up" as accidents of similar import would not be if associated with any other activity.

For instance, in its issue of April 22nd we find the accident which killed six in California given first page space and plenty of it under a big headline, but four killed and four fatally hurt in an Ohio automobile accident gets 17 lines and a small head, while a disaster in Philadelphia (also motor car) which tortured three to death and sent four others, some dying, to a hospital, gets twenty-six lines and a little head. Contrasts of this sort could be cited in great number.

The brethren of the press ought to forget that we're an infant industry and stop thinking that every error in our calculations is worse than anybody else's mistake. We're getting safer, saner every year. We're growing up as rapidly as possible. Can't yer give a kid a chance?

When the time comes when we have lost our novelty, there will be certain compensations for the change in public attitude toward us.

THOSE "NO SMOKING" SIGNS

THERE is a great lesson to be learned from the $3,000,000 loss caused by the careless cigarette-smoker who threw his stub down without watching it drop or treading out its glow at the Los Angeles Aircraft and Automobile Show. It should be a lesson to managements of shows, and to exhibitors; indeed, it should be a lesson to the whole aircraft manufacturing industry. We have visited other shows which did not burn but which made every motion necessary for that kind of disaster. Nothing but kind fate saved them. I have seen not only the public but employees at such exhibitions smoking their fool heads off. In some of the great factories, it is just as bad. Recently we had occasion to visit one of the large aircraft manufacturing plants which the general manager took us through. Everywhere were "No Smoking" signs big enough for bad eyes to read, but that general manager smoked away on his big cigar during the whole trip of inspection. It's carelessness. Well, it was carelessness that cost the nation five hundred million dollars in fire losses last year. Let's correct this in the aircraft industry, and let's do it now.

AERONAUTIC EXPORTS INCREASE

By Courts D. Rea

Transportation Division, Department of Commerce

THE trend in commercial aeronautic development throughout the world is borne out by recent foreign sales of United States aircraft. Airline developments and the new uses for the airplane within this country, which has flying conditions as unfavorable as any part of the world, are as much responsible for the increased exports as were the long-distance flights of 1927.

Had the 1928 total of shipments from the United States been $49,706 greater—which would have been attained with the export of one additional transport plane—the valuation of aeronautic exports for 1928 would have equaled the combined values for the previous three years, when $3,714,429 worth of aeronautic products were shipped or flown to foreign countries. Exports of the three aeronautic groups in 1928 alone were valued at $3,664,723. Airplanes, seaplanes, and amphibians were exported during 1928 to the extent of 162 units, valued at $1,759,653. This valuation was greater by $96,654 than the combined total for the three years preceding, when 193 aircraft went abroad. United States airplanes were purchased last year by 22 countries as compared with 15 during 1927, which indicates a healthy diversification in markets.

The foreign business in airplanes, though small in comparison with that in other transportation equipment, has been obtained more by accident than by design. But probably 70 per cent of the earth's area has need for more adequate transportation facilities and, since the airplane needs no expensive roadbeds, it is reasonable to suppose that there will be almost immediate and material increases in the foreign trade in aeronautic products—a recognition of the fact that airplane use in this country is paying its way.

In addition to the fact that 1928 was the record export year for United States aeronautic products, the increase for 1928 over 1927 was more pronounced than for any similar period. Aircraft exports advanced from 63, valued at $848,568, in 1927, to 162, valued at $1,759,653, in 1928. Canada took 62 airplanes as compared with 26 in the preceding year. Peru, which took only 8 airplanes in 1927, was the destination for 24 during 1928, while Mexico was the purchaser of 20 as compared with only 1. The fact that the American embargo was lifted on airplanes into China during 1928 accounted for 9 being shipped to that country. Latin America, including the West Indies, absorbed 75 planes, or 45 per cent of our total exports for the year—a fact which attests the increased interest of United States aircraft manufacturers in that important marketing area. Chile was the one South American country purchasing American aircraft during 1927 which made no purchases in 1928; but early this year there will be a considerable movement of planes to that country because of a sale concluded last year.

The accompanying table, showing all countries of destination for 1928, with comparisons for the preceding three years, indicates larger unit shipments for the latter period to Canada, Peru, and Mexico, as well as the fact that 21 airplanes, valued at $280,065, were shipped during 1925-1927 to countries not purchasing airplanes from the United States in 1928.

Exports of airplane parts during 1928 reached a total value of $1,240,244, or nearly 118 per cent above the 1927 figure of $570,117. Canada heads the list of countries of destination for parts during 1928, taking over three times as many as in 1927. Soviet Russia in Europe continued to be among the principal markets for parts, and the increase in similar exports to China was 363 per cent greater than during the preceding three years.

The accompanying table shows a very favorable export trade in parts during 1928, as compared with the years 1925-1927.

Exports of airplane engines, although not showing so great an increase over 1927 as did airplanes and parts, advanced from a total of 84 engines, worth $484,875, in 1927 to 179, valued at $664,826, in 1928. The decrease in the average unit valuation is surprising and may be explained partly by the fact that in 1927 the higher-powered surplus war engines were being exported, whereas in 1928 these stocks had become about exhausted. Furthermore, during 1928 the lower-powered surplus war engines constituted the bulk of exports, which might account for the decrease in average unit value.

The gain in exports of aircraft engines and parts during 1928 is remarkable, not alone for its high percentage but for the fact that this was effected in the face of such obstacles as keen competition and (*Continued on page* 254)

United States exports of airplanes, seaplanes, and amphibians

Country of destination	Total for three years ended Dec. 31, 1927		1928	
	Number	Value	Number	Value
Canada	50	$218,037	62	$685,712
Peru	15	280,196	24	199,810
Mexico	13	88,651	20	190,133
China			9	102,175
Italy			2	84,950
Japan	2	49,112	3	63,000
Brazil	12	78,264	5	66,340
Cuba	12	108,162	4	54,887
Argentina	32	215,113	5	55,052
Australia	8	23,151	7	50,872
Siam			4	38,400
Guatemala			3	36,400
Philippine Islands	11	154,159	2	34,500
Panama			1	23,844
United Kingdom	7	23,970	3	22,263
Colombia	4	97,769	1	19,250
Honduras	2	9,350	1	9,000
French Oceania			1	6,000
Germany			1	5,500
Switzerland			2	4,532
Belgium	3	35,000	1	4,183
Bermudas	1	2,000	1	2,850
Other countries	21	280,065		
Total	193	1,662,999	162	1,759,653

United States exports of airplane parts, except tires

Country of destination	Total for three years ended Dec. 31, 1927	1928
Canada	$190,273	$540,215
Soviet Russia in Europe	165,631	155,313
China	18,719	86,888
Germany	5,488	70,548
United Kingdom	107,103	58,166
Philippine Islands	4,969	53,630
Brazil	9,864	40,686
Japan	2,507	31,797
Cuba	15,838	24,184
Panama	4,854	22,705
Mexico	10,979	21,162
Netherlands	3,222	20,483
Chile	46,818	17,443
Spain	75	15,940
Peru	165,832	15,693
Argentina	11,390	15,499
Colombia	11,901	10,482
Italy	7,876	6,546
Poland and Danzig		4,575
Sweden	87	4,455
Czechoslovakia	70	3,890
Other Netherland East Indies		3,250
Australia	$8,101	$2,741
Honduras	7,115	2,253
Hong Kong		2,182
Norway	2,330	1,925
Guatemala	211	1,517
France	4,315	1,303
Siam	618	1,101
Nicaragua	761	990
Switzerland		950
Persia		684
British India	108	500
British Malaya		150
Denmark	120	100
Java	1,217	73
Jamaica		73
Uruguay		70
Dominican Republic	5,169	62
Other British West Indies	201	20
Other countries	9,068	
Total	822,030	1,240,244

United States exports of airplane engines

Country of destination	Total for three years ended Dec. 31, 1927		1928	
	Number	Value	Number	Value
Canada	65	$166,730	48	$177,946
Germany	38	156,705	23	132,510
United Kingdom	39	270,718	29	75,780
Netherlands	7	17,182	14	62,712
China	6	29,193	5	38,900
Japan	6	28,793	10	41,281
Mexico	6	29,025	10	24,773
Argentina	7	19,531	7	23,315
Sweden	30	6,951	2	19,911
Denmark			1	19,345
Belgium	5	71,103	1	10,000
Italy			4	8,338
Peru	7	22,843	2	8,002
France			3	0,223
Brazil	2	2,500	8	6,200
Poland and Danzig	1	4,260	1	3,574
Spain	1	4,100	1	3,111
Australia	13	7,265	2	1,525
Hong Kong			4	980
Cuba	1	85	3	250
Panama			1	150
Other countries	220	392,416		
Total	454	1,229,400	179	664,826

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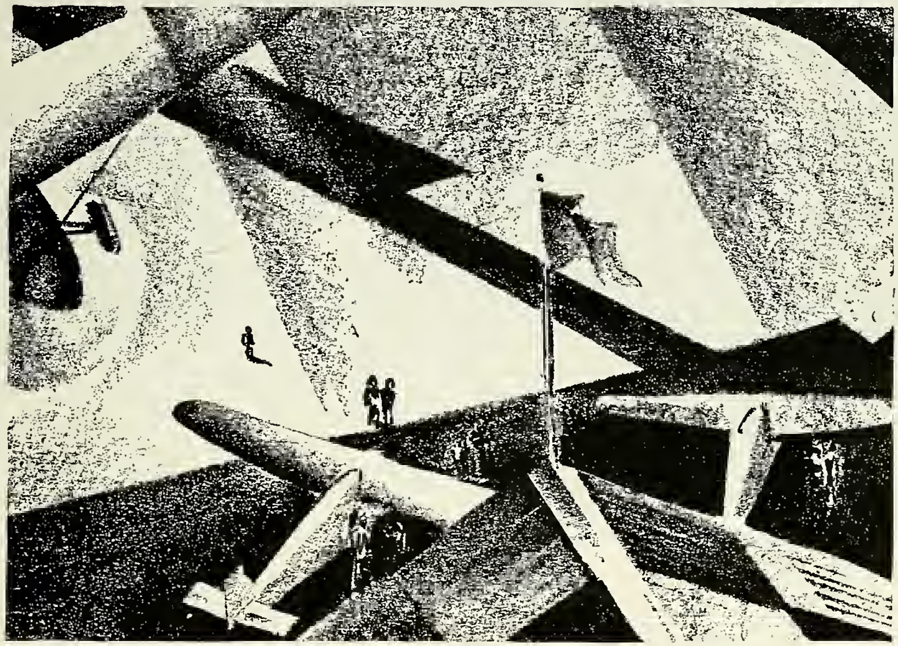

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PERSONAIRLITIES

by Caldwell

SOMEBODY better rush to the assistance of poor old H. B. Poindexter of the Raleigh Flying Service of Raleigh, N. C. Hank writes that he is simply worried to death over a problem that has been giving many of us concern—a problem that has been put squarely up to the leading mathematicians, booticians, and opticians of this land; in short, where are some of these pilots getting in the thousands of hours' flying time they are nonchalantly crediting themselves with? That, as a Mr. Shakespeare remarked, is the question. And I pause for an answer, while I give you the result of Hank's deliberations on the subject.

"Where are they getting all that time?" writes Hank, apparently sobbing on his stenographer's shoulder, for the paper bore evidence of having been splashed with something, either tears or corn juice, I don't know which. "I have been pretty patient and bearing up well under the strain until I read a pamphlet put out by one of our well-known flying schools. Among the pilots on their roster was a super-instructor with 15,000 hours in the air! Must admit that I suffered a complete breakdown upon noting this. Got out my pencil and paper and started a lot of figuring but was unable to arrive at any such colossal number of hours in the air. This fellow undoubtedly started flying long before the Wright brothers met Kitty Hawk and were still building bicycles for men with strong legs and weak minds. To give this 15,000-hour bimbo the benefit of the doubt, I went to see a professor of mathematics at the local university. I explained the problem, but the professor frankly admitted that he had not advanced far enough in the various branches of higher mathematics to use any intricate formula whereby we could check these hours.

"Please advise me if there has been a change made in the way of computing elapsed time. I have always understood that there were 60 minutes in an hour—unless the hour was spent in Boston, in which case there seem to be about 120 long minutes in each hour—and I understand there are 24 hours in a day. These long-hour birds must have a new system, or halitosis. Or perhaps they work on daylight saving. I started flying during the war at Kelly Field —" (I thought that war was in France, Hank!)—"and I've been in the game steadily ever since. No doubt I have been very generous to myself in putting down my flying time, but to save my life, I can't get in all this time that some of the fellows claim who started flying years after I did. Please do what you can for me about this problem, for I am terribly worried."

Will the gentleman with the 15,000 hours come forward like a little man and tell us all just where he got that time? Hank is recovering slowly from the shock, but if he doesn't get a solution of the problem he's apt to suffer a relapse. Perhaps the bird did all his flying in Glenn L. Martin's famous M O 1. An hour in that airplane equalled in strain 100 hours in any ordinary aircraft, and therefore could justly be computed as 100 hours. That's how I, for instance, got in most of my hours, and half my grey hairs. And how did I get the other half grey? asks the little boy in the back seat. Well, sonny, I'm married.

* * *

I ASKED Vern C. Gorst for a few words about himself, and all he wrote about was his airline—and not a word about himself. So I simply chucked his letter in the waste basket, along with one from a girl who said she'd be willing to love me like anything if I'd teach her to fly for nothing, since she wanted to be the first woman to cross the Pacific—and what a credit that would be to me, she said! Yes, wouldn't it! Well, I never would have got that biography of Vern Gorst, only he happened to get married some years ago, and now has a very charming young daughter with the pleasing name of Myrtis, who is a co-ed at the University of Oregon. Myrtis saw my letter to Dad, and sat right down and wrote his biography in a very dignified and scholarly manner which does credit to her expensive education. And I'd print it just as she wrote it, only it would be above the heads of you six rough-necks and much too good for you. Besides, I don't want you to read good literature or you'd get dissatisfied with the pidgin English I purvey each month—and then where would I get the money I put into the North German Lloyd Common at 69, so I could have the exquisite agony of watching it flop gently to 57 as soon as I got aboard? (And it still hurts a little, doctor.)

Vern C. Gorst

Vern C. Gorst is president of Seattle Flying Service, vice president of Pacific Air Transport, and president of Barnes and Gorst Airlines, which are operating the air mail line between Seattle and Victoria, B. C. And now he heads Gorst Air Transport, which will open a passenger route between Seattle and Juneau, Alaska, with a fleet of ten-place amphibians.

And how did he get that way when he started for Alaska at the age of eighteen with a capital of 25 cents? Well, he had been clever enough to learn, at the age of twelve, that nobody gets far by working himself to death; and that while there may be a certain amount of dignity to labor, the returns (outside of a tired feeling) are slight, almost negligible. The way he made this valuable discovery was as follows: His father told him to row across Port Orchard Bay to deliver loads of poultry and other farm produce. Vern obediently started to row, row, row—and collected the usual crop of water blisters. If he hadn't been bright, he would have kept on rowing until he raised callouses on his hands and his pants. But, realizing that a labor-dodger is the only fellow who gets far in this world, he rigged up a sail and let the wind blow him across, while he sat there figuring out what other work he could avoid.

He went to Alaska and did mining for a time, but it was too hard work, so he returned to the States, and started a transportation business at Wonder, Nevada. Since there was little water at Wonder, Gorst transported water in five gallon cans from a valley several miles away. That is to say, a flock of burros transported the water while Vern saw to it that they transported it. He didn't carry a single gallon himself.

Still, he had to do some walking, which tired him, so he returned to boating at Port Orchard and simply sat in the boat while an engine did the work. The engines worked so hard that Vern soon had seven boats, which he sold at a profit, investing the money in an auto stage line between Medford and Jacksonville, Oregon, in 1911. That was the

(*Continued on next page*)

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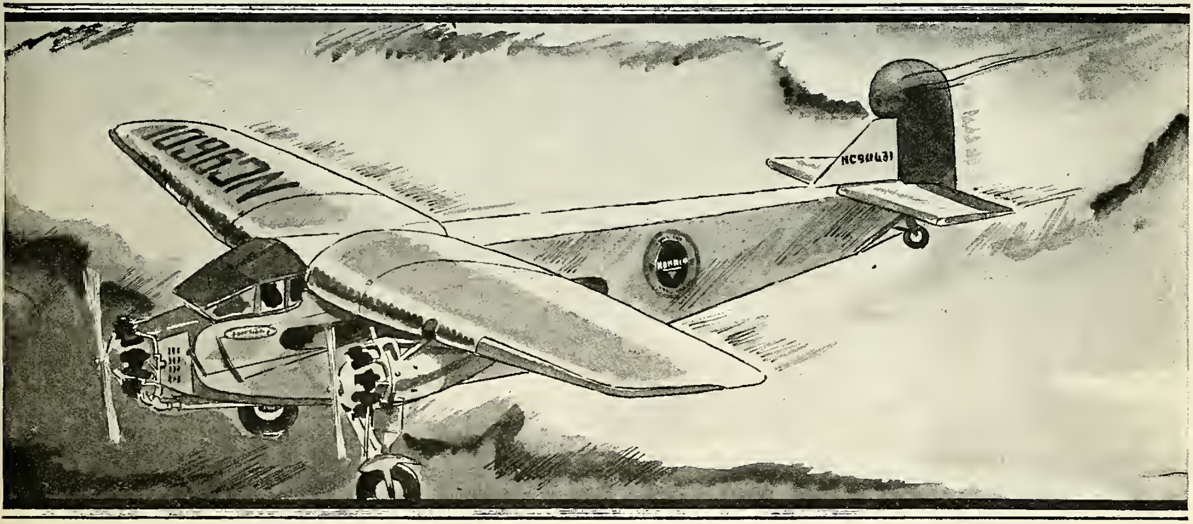

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(*PersonAIRlities continued*)

first auto stage line in Oregon. With Charles O. King, another man who evidently objected to walking or rowing, Gorst organized several stage lines—the Vallejo Bus Co., the Coast Auto Lines, and the Motor Coach Co.

This was all right, but still too hard work—changing tires, collecting fares, etc. In 1913 Vern noticed what an easy time pilots seem to have of it—standing about fields, talking, and every now and then flying for a few minutes. (That's what it used to be in 1913, anyhow.) So Vern got him a Martin pusher biplane—one of those early peculiarities that had the propeller in behind, threshing away amid a flock of tail-booms. Vern sat boldly out in front of this collection and forged through the air. There was hardly any work to it at all, only a lot of worry. He liked it so well that he kept right on flying and resting until 1926, when he organized Pacific Air Transport and hired a lot of people who hadn't learned to sit still and do nothing. These good fellows flew madly up and down the coast between Los Angeles and Seattle, while Vern watched them interestedly. When Mr. Boeing bought out the line, Vern didn't even have to tire himself out watching it, though he still does, just for interest and dividends. He also watches Barnes and Gorst Airlines, Inc., plying busily between Seattle and Victoria, and does just enough flying to keep in practice. He finds it very restful to fly, and then come down and sit around and consider how nice it is that he really doesn't have to fly unless he wants to.

As I said, I got all this from his daughter, Myrtis, who tells me that she is going to take flying instruction herself as soon as she can get permission from mother.

* * *

FROM Spokane Airport non-stop to St. Paul in 11 hours and 12 minutes in a Buhl special sedan is the record made by Pilot Nick B. Mamer last October. His passenger was Mrs. Paulsen, wife of Clarence I. Paulsen, president of the Mamer Flying Service of Spokane. The flight was one of the longest non-stops ever made by a regular commercial passenger ship and one of the longest flights ever made by a woman in the United States. After that announcement sinks in we may expect a deluge of ladies flying along for hours and hours and landing in the newspapers. It's getting so now that you don't take off with the intention of landing at some airport—you devote all your energies to landing on the front page. Well, it's good sport and advertises aviation. On another occasion Nick flew a woman from Spokane to Seattle, 275 miles in 2¼ hours, so that she could save eight hours in arriving at the bedside of her very ill daughter.

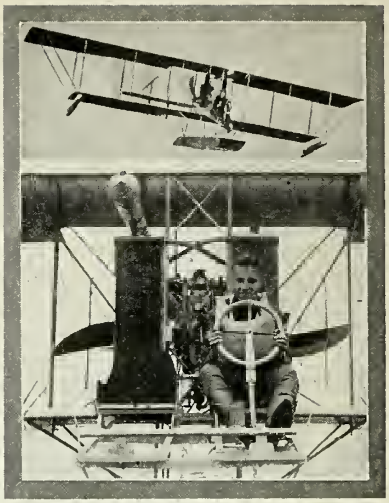
Mrs. Paulsen and Nick B. Mamer

Nick Mamer is one of the old timers. He served three years in the Army Air Service during and after the war, enlisting as a private and emerging as a 2nd Lieut. Then he started barn-storming with Jennies and Standards in the Middle West, and followed Horace Greeley's advice in 1920, landing in Spokane. He has barnstormed every city and village in the mountain states of Montana, Idaho, Washington, Utah, and Oregon, and in 1923 inaugurated the first private contract for Air Forest Patrol in the U. S. For the past three years he has been chief pilot for the U. S. Forest Service Air Patrol, putting in over 750 hours in that work. He's flown over forests and mountains for so long that he has actually managed to persuade himself that it's safer than flying over the plains of Kansas. He says: "I am of the opinion that it is safer to fly over the mountain and timbered country than elsewhere, as a pilot will keep his equipment in better condition to offset the hazard of a forced landing in rough and heavily wooded country, thus reducing the possibility of having a forced landing on account of mechanical failure." There's something in that. Eastern pilots especially become more thoughtful when they start flying over those mountains and woods. Some of them decide at once to care for their engine more tenderly, while others decide to stick to Kansas.

Nick has put in over 4,000 hours in commercial flying, has carried over 10,000 passengers, and has never injured a passenger or himself. The Mamer Flying Service has five planes, operates a flying school, does aerial photography, and totes the ladies around. Nick, one of these days I'm going around.

* * *

IF you're flying past Connecticut in a seaplane or boat, and need a cargo of wooden nutmegs or a drink, drop down at the New Haven Air Terminal, on the east shore of New Haven Harbor, and meet Jack Tweed, one of the real old-timers. Tell him to get out of that old Seagull and run you uptown to that place on a side street where they don't use nutmegs, but put an olive or cherry in it. I spent an evening with him there, and I have only a hazy remembrance of catching a train to New York afterwards. I asked Jack for some pictures of the old days, but he never sent me one. A pupil of his, however, James P. Pigott, D.D.S., who graduated from Jack's school and who now flies his own MF boat, sent me the accompanying picture and a little biography of the modest Tweed.



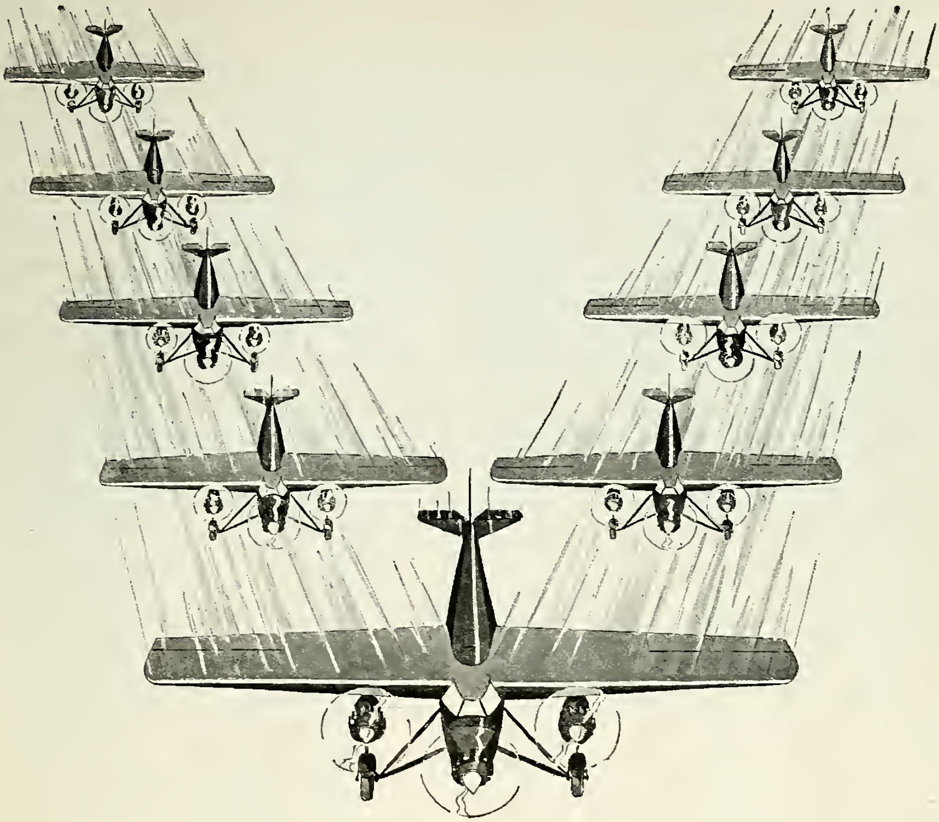
Jack Tweed and his Thomas pusher.

It seems that Jack got into the air by accident. He had gone out on Conesus Lake, N. Y., back in 1912, only to test out the floatation qualities of a Thomas Brothers seaplane and was taxiing about, when he suddenly discovered that the ship had taken off. And at that time all he had learned was how to taxi. An embarrassing moment! The ship flew him along for some distance while Jack pondered the problem of how to get down. He finally got it figured out that if he throttled the engine that the ship might come down, so he tried it and landed with ease and considerable relief. Since that time he has spent some 4,000 hours in the air, most of them willingly. He constantly instructs on Seagulls, so you can imagine that he is a man of infinite patience and lives a life of quiet suffering. There's a gentle, resigned, almost sad, look about the lad that can come only from long hours spent in old Seagulls with new pupils. When he produces his new three-place flying boat, the Tweed Sea Hawk, he'll probably look a whole lot brighter.

Before the war Jack flew for Thomas Brothers, after which he went through Mass. Institute of Technology and became an instructor in the U. S. Navy at Pensacola and Panama with the high-sounding title of Lieutenant, Junior Grade. If he had only stayed with them for forty more years, they'd have made him an admiral, or retired him. But he got impatient and with his brother Charlie established the New Haven Air Terminal. The picture shows him flying the old Thomas pusher. In the event of a crash you will note that he was just one jump ahead of the engine and less than half a jump ahead of the radiator.

* * *

WE hear a lot about these famous pilots who are beating records from Coast to Coast, but does anyone remember who was the first pilot to fly from the Pacific to the Atlantic, when he flew, and in or on what? Next month I'll tell you about it.



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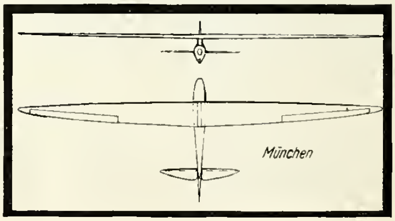
RHOEN GLIDER COMPETITION

THE gliders entered at the Rhoen Glider Competition in 1928 showed a decided improvement in construction and numbered many new types. A rather complete report of the competition was published in the German magazine ZFM, from which the following information is compiled.

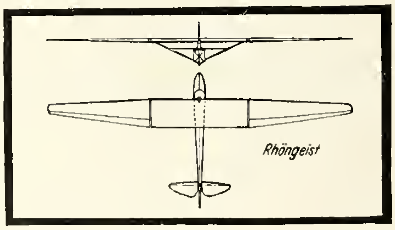
For the first time two two-seater training gliders of the "Djalar" type were entered in the competition. They were the "Luftkurort Poppenhausen" entered by A. Schleicher and the "Rostock" by the Aero Club of Mecklenburg. Both gliders were flown as single-seaters, and because of their low wing loading, were capable of making glides with the least favorable wind. The "Poppenhausen" is a parasol monoplane type with a wing span of 49.8 feet and a wing area of 290 square feet. The wing is rectangular in plan form with rounded tips and the airfoil used is Göttingen 358. The tail is supported on a single boom attached to a short pilot's nacelle. The weight of the plane is 265 pounds, and its wing loading as a single-seater, 1.44 pounds per square foot. The performance of this machine was excellent.

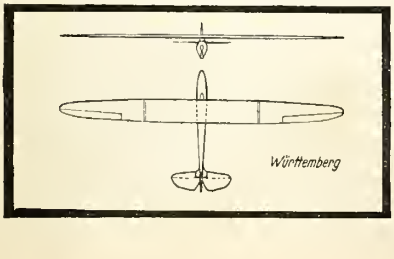
The "Rostock" of the M. A. C. was built more for the practical use of the club and was smaller than the "Poppenhausen." Its wing span is 39.4 feet and the wing area 237 square feet. The wing is of standard wood construction; the rest of the structure is of steel tubing. The weight of the glider is about 221 pounds. Although its wing loading was higher, it appeared to have a better performance. It would seem that for training purposes sensitiveness of control is more important than mere gliding ability. The total number of gliders which took part in the competition was 22, of which 9 were of popular make, 2 newly built (but previously tested) and 11 were new designs.



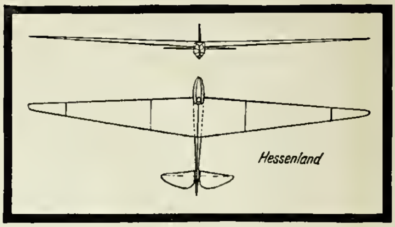
Of the older types, the best performances were shown by the "Fuldaer Albert" and the "Westpreusen" flown by Hoffman. Next to the "Westpreussen" in performance was the "Wurtemberg."

This type is without a doubt one of the best gliders. The cantilever wing, rounded at the tips, has a wing span of 49.6 feet and a total area of 161.5 square feet. The tail surfaces consist of single moveable units. The glider weighs 353 pounds, and its wing loading is 3.07 pounds per square foot. Despite this comparatively high wing loading, its sinking speed was remarkably low so that the glider was capable of soaring with a very light wind.

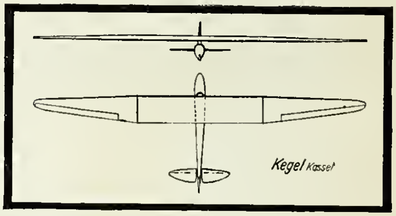




In connection with attempts to improve the performance of a glider by increasing the aspect ratio of the wing, the following general conclusions reached by Mr. Kupper are given.



According to his calculations in the case of a cantilever wing with an aspect ratio varying between limits of 8 and 22, the influence of the weight of the wing proper on the sinking speed of the glider is so small that it can be neglected. From mathematical investigation of the problem, he deduces further that, given the span, the weight and parasite resistance, the minimum sinking speed is only a function of the maximum L/D of the profile and the aspect ratio is a direct function of the profile.



An attempt to check this theory was made by the "Akademische Fliegergruppe Munchen" using profile 652 with an aspect ratio of 21. Structurally it was possible to achieve a strong construction by using a thin-walled box beam. The test, however, was not successful because the machine had defects which influenced its performance.

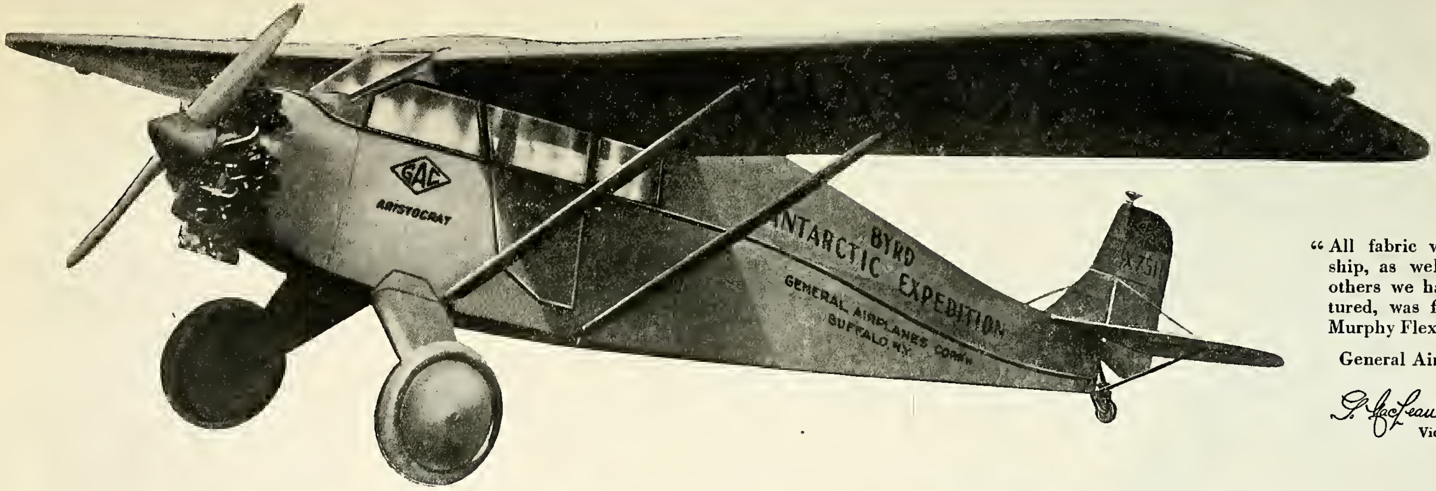
An interesting and carefully designed glider was brought out by Kegel. It had an unusually narrow fuselage, the use of which was made possible by employing specially designed wheel type control columns. The span of the wing is 57.4 feet, and the wing area, 204.5 square feet (aspect ratio 16). The weight of the glider is 243 pounds or about 110 pounds less than any other glider of similar design.

Another example of an interesting glider is Schleicher's monoplane. The airfoil used is Göttingen 549, with an aspect ratio of 12 and a total wing area of 215 square feet. The front part of the fuselage is round, but aft (at the tail) it flattens out. The horizontal tail is a single moveable surface. The weight is 331 pounds, and the wing loading, 2.25 pounds per square foot.

Kirschner's monoplane, "Hessenland," was built similar to the construction of "Lapruvo" of 1927. Instead of using standard rib construction the airfoil shape was preserved by employing special fairing capstrips, and standard ailerons were replaced with moveable wing tips. With a span of 59 feet and a wing area of 226 square feet (an aspect ratio of 15.4), the weight of the glider is only 179 pounds. The wing alone weighs about 99 pounds.

Aerodynamically the location of the cockpit is unfavorable, because it results in a central leading edge cut-out. The flights did not indicate any improvement in the rate of descent of this glider, which could be expected because of its low weight.

(*Continued on page* 252)



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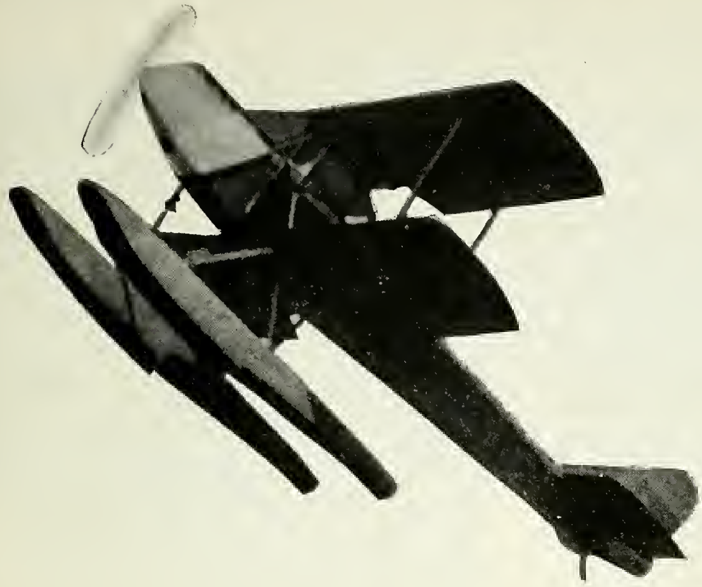
By design and equipment it is the ship that most closely fits the needs of the flying instructor and the sportsman . . . flyers who demand a plane that has been tested and proved staple, economical and easy-to-handle in years of flying miles.

THE OUTSTANDING SPORT AND



Compare it with any other light plane, feature for feature. Its split-axle undercarriage with an unusually wide track is resilient and sturdy. It combines with the steerable rudder strut to make taxying easy. Added to its inherent stability and airworthiness is the safety found in the Handley-Page wing slots which eliminate danger of spins, improve lateral control and lower landing speed. Powered with a Cirrus Mark 111, 95 h. p. air-cooled, four-cylinder in-line aircraft engine recognized in the world of aviation as one of the most reliable and economical light engines. Its price is only $4995 flyaway or F. O. B., Bridgeport, Conn.

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We are completing national distribution and arranging representation in the leading aviation centers of the country. Interested and responsible parties are invited to write for further information concerning sales plan.

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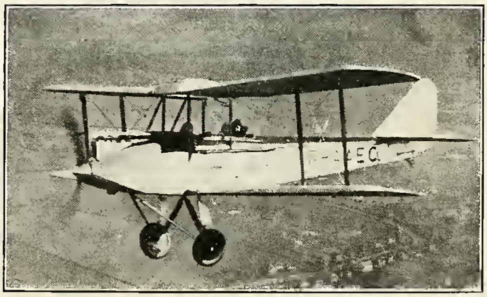


TRAINING PLANE OF THE WORLD

INTERIORS of CABIN AIRPLANES

(Continued from the April issue of AERO DIGEST*)*

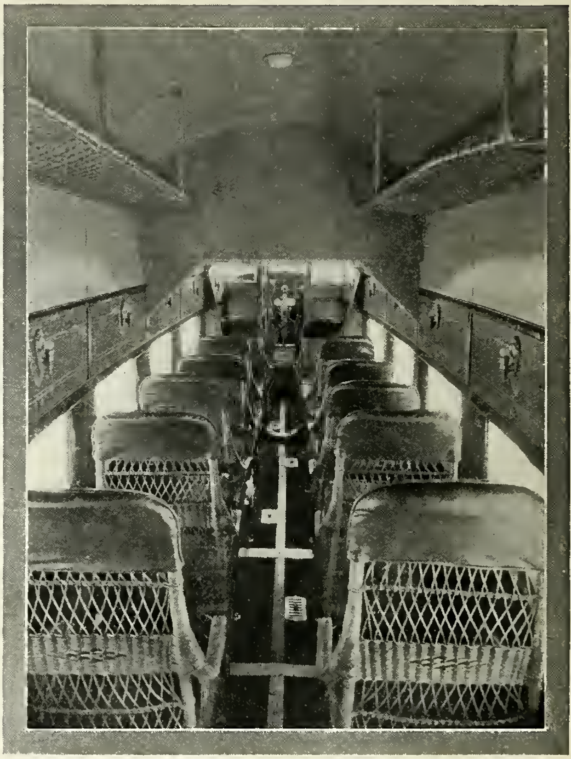
IF the airplane cabin is to afford the maximum in comfort, it must embody features other than mere roominess and well-cushioned seats. It must also incorporate beauty and it must have individual appurtenances contributing to the convenience of passengers. Beauty is important because it creates in the passenger a feeling of confidence in the entire ship and its pilot—a psychological factor which is too often overlooked in the present state of air transportation. Individual fixtures in the cabin add emphasis to the passenger's feelings of assurance, for they furnish a completeness which would otherwise be lacking. Such, of course, is only an incidental function and not their principal purpose. A dome or wall light, for instance, is primarily intended to illuminate. Likewise, lavatories, kitchenettes, electric cigar lighters, window shades, luggage racks, etc., all serve special needs in air travel which have made them a necessary part of the modern cabin plane. Indeed, equipment of this type has become of such importance that certain manufacturers, such as the Dayton Manufacturing Company, are making special studies of airplane hardware and fixture requirements. As an example, the Dayton company has devised a folding lavatory for smaller cabin planes which at once provides a desirable convenience and conserves space.

Because of the size and shape of airplane cabins and compartments, conditions necessitating special treatment of interior fittings continually arise in their manufacture. Nor does the problem end with that, for the kind and weight of the material also entail a special problem. Nickeline fixtures are always handsome and not subject to corrosion, but they are heavier than those of aluminum.

How well aircraft manufacturers have met these conditions and to what extent the refinement of cabins has progressed will be evident from the following description of particular cabin interiors.

T. A. T. Ford

Special mention is made here of the interior of the Ford trimotor type which will be used on the Transcontinental Air Transport air-rail route because it represents the results of an extensive and special study of transport airplane requirements. After investigating several interior arrangements, T. A. T. will probably begin operations with the type pictured herewith. In general, the arrangement resembles that of the modern railroad parlor car. Handsome polished panels run the length of the cabin just above the windows. Along the panels above each seat are special wall lights with individual switches. In the ceiling is a large dome light. The chairs, which are of wicker with padded leather seats and head rests, are arranged in rows with a wide aisle between. Overhead on each side there is a special rack for personal appurtenances. Heaters are located at regular intervals along the aisle. The pilots' cockpit is separated from the passenger cabin by a partition and door, but is visible through glass windows.


Interior of a Transcontinental Air Transport Ford.

Buhl Standard Airsedan

Blue mohair is the predominating feature of the interior of the Buhl Standard Airsedan. Generous accommodations for four passengers and two pilots are

The interior of the Buhl Standard Airsedan is finished in blue mohair.

Quiet Comfort *for* Air Travelers . . .

Solved By U. S. Bureau of Standards Tests

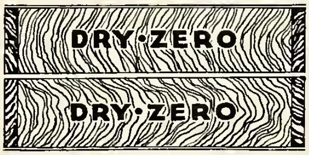
An important problem in the manufacture of cabin airplanes has just been solved by the United States Bureau of Standards.

For one year the Bureau has been experimenting with various means of assuring quiet-comfort for air travelers through improved construction of cabin walls. Early in their experiment it was established that DRY-ZERO AIRPLANE BLANKET combined the requirements of lightness and sound absorption efficiency in an unusual degree.

A large cabin plane was divided into two parts. Walls of the forward half were sound deadened with DRY-ZERO AIRPLANE BLANKET; in the rear half another material was used. Conversation in the DRY-ZERO insulated half of the cabin was found to be as pleasant and easy as in a Pullman Parlor Car; in the other half it was difficult to understand conversation in unusually loud tones.

The tests prove that sound control can be accomplished by means of DRY-ZERO with the least possible loss of pay load weight. DRY-ZERO weighs two ounces per board foot—the lightest sound-absorbing material in commercial use.

DRY-ZERO CORPORATION, at some expense, has made up sample sections of the cabin wall construction found by the Bureau to be most effective. One will be gladly sent to cabin airplane manufacturers who are really interested.



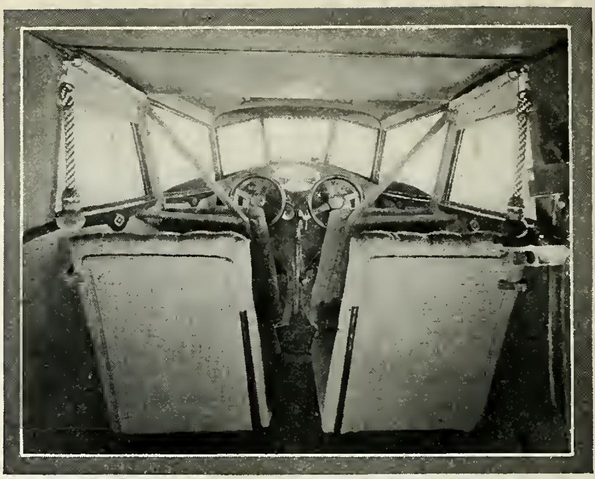
The above illustration is a diagrammatic presentation of a section of the wall used in the U. S. Bureau of Standards Quiet-Comfort tests. Model sections may be obtained upon request.

DRY·ZERO
CORPORATION
130 N. Wells St. Chicago, Ill.

afforded by the size and arrangement of the cabin. Deep spring seats equipped with safety belts are covered with mohair. The walls likewise are finished in blue mohair and trimmed with walnut.

The two seats 'midship tilt forward to allow easy access to the pilots' cockpit. Two dome lights set flush in the ceiling-windows are provided with roller shades.

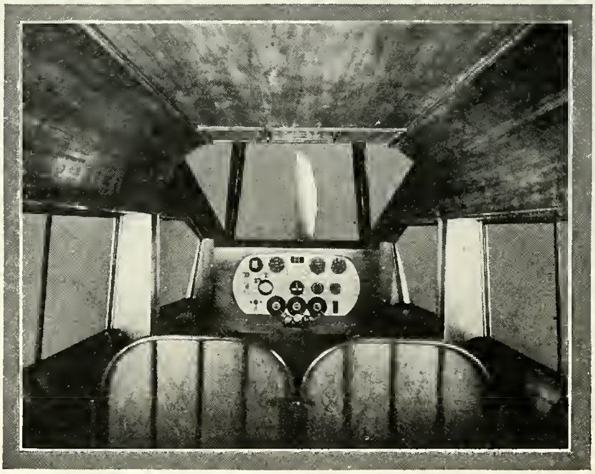
Both passengers and pilots enjoy the utmost in visibility. The non-shatterable glass windows are large and well placed. A very interesting and novel feature is a rear view mirror set in the top of the fuselage over the head of the pilot. This attachment is like a small hatch—the under side of which is a convex mirror. The pilot by merely pressing a lever can turn the hatch and command a 180 view aft. When not in use the hatch is closed, fitting into the streamline of the plane.


Cabin appointments in the Invincible monoplane.

Invincible Cabin Monoplane

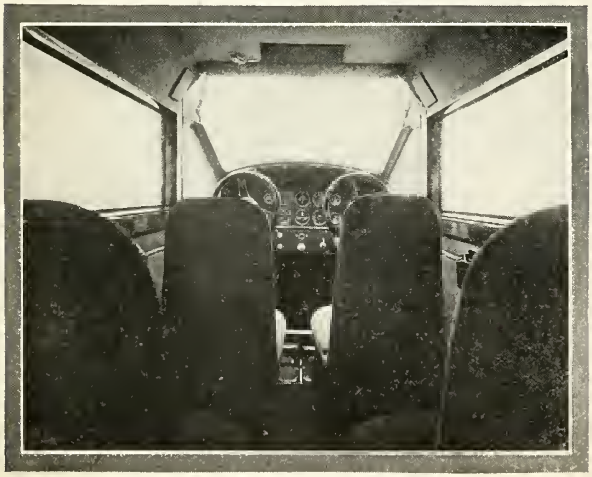
One of the most interesting and complete new cabins of the small type is the Invincible monoplane, produced by the Invincible Metal Furniture Company, Manitowoc, Wisconsin. The general finish throughout consists of harmonious combinations of red broadcloth. The seats and side walls up to the window sills are upholstered in a heavy pattern fabric. The ceiling and walls above the window sills are covered with a handsome single-tone material. On the floor is a red carpet which matches well with the walls and ceiling.

The window sills alongside are of polished walnut with a unique design in color on each. To provide ventilation the window beside the pilot's seat slides open. A small window through which the pilot can see the ground and the landing gear at all times is provided below knee level on both sides forward. Above the two front seats there is an emergency exit of non-shatterable glass, which also serves as a ceiling window for vision above. Controls are of the dual Dep type, the control wheels and instrument board being finished in polished walnut. The brakes and rudder pedals which are of nickel, are conveniently placed.


A forward view in the trimotored Kreutzer.

The backs and seats of the chairs are fully padded, and, as previously mentioned, are upholstered in a patterned red fabric. The same material is used on the safety belts. Moreover, all supporting members in the cabin are covered with the same cloth as the rest of the upholstery.

Overhead is a dome light similar to those used in enclosed motor cars. The windows aft are fitted with roll shades, which are red to match the upholstery. On the rear cabin wall are an electric cigar lighter and ash trays placed in two walnut finished sets. The cabin is entered through a large door on the right side aft of the rear seats.


The cabin of the Verville Air Coach.

Kreutzer Air Coach

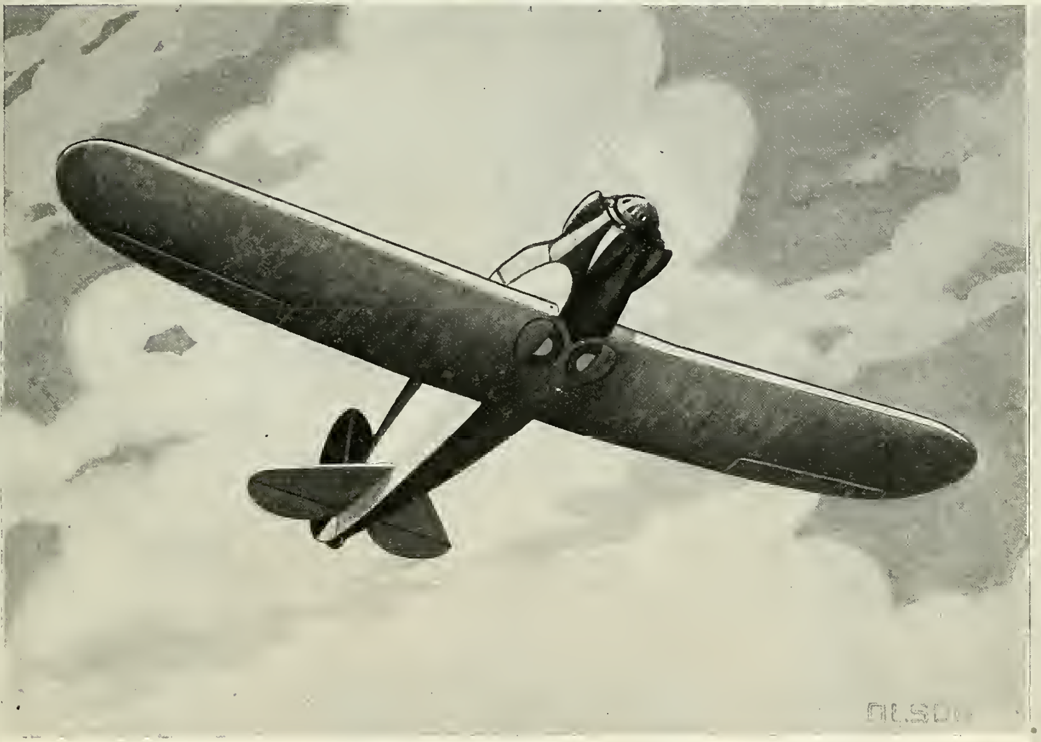
The cabin of the Kreutzer Air Coach is unique in that it is not upholstered with fabric or leather but is finished throughout in natural figured gum wood. This gum, which covers the walls and ceiling, is handsomely polished with Johnson wax.

Good vision for the pilot is afforded by Triplex non-shatterable glass windows in front and well located windows at the sides. Controls are optional,—dual Dep or stick. The throttles are so grouped that the pilot can regulate the speed of all three engines with one hand. The knob handles on the throttles are of polished agate. On the ceiling, within convenient reach of the pilot, are six cocks to cut off the fuel to the engines and from the gas tanks.

Another interesting feature lies in the fact that, although none of the forward windows slide or open, adequate ventilation is provided through a small screened porthole beside each passenger seat. This porthole is opened and closed by means of a small push-pull rod. The advantage

(*Continued on page* 258)

The new **BULLET**



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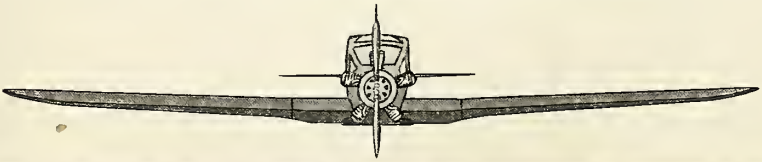


EAGLEROCK

THE MAGNETO COMPASS

By F. P. Wills,

Marine and Aircraft Engineering Department, General Electric Company

THE earth may be likened to a very large permanent magnet having a very weak field and poles whose positions are changing both continuously and daily in short periods.

The slow, continuous change in position has been predetermined for a number of years, the diurnal variation is often noticeable in magnetic storms.

The designer of a compass usually has several grievances against Nature. She has not made the earth's field strong enough. A field of roughly half a gauss is the most that the designer can expect and that has a direction which varies over the whole surface of the world with perfect lack of coöperation on the part of nature.

The component horizontal to the earth's surface is the only one which interests man in methods of navigation.

Also, the direction of the magnetic north does not coincide with that of geographical north. From Seattle, Washington, one looks 25 degrees to the east of true north to look directly toward the magnetic pole. From Maine, one must look 20 degrees to the west of true north. This is a change of 45 degrees within the United States.

When flying in the state of Washington, the aviator must subtract 25 degrees from his compass reading to get true north, provided no other compass errors exist.

This regrettable state of affairs forces the aviator to carry a small map showing the magnetic declination.

Probably it will be helpful to include a list of the errors to which any type of magnetic compass is subjected.

These errors will be explained later. Declination, described above, will not be listed as an error. It is nature's mistake.

(1) Ship's magnetized iron.
(2) Ship's unmagnetized iron.
    (a) Unsymmetrical in the horizontal plane.
    (b) Unsymmetrical in the vertical planes.
(3) Acceleration errors due to compass card being suspended as a pendulum.

For aircraft magnetic compasses, it is practical to provide compensation only for any permanent magnetism due to the magnetized parts of the ship. The location of the magnetic compass must be in front of the pilot somewhere on the dashboard. This is usually about the worst magnetic position on the ship, due to the engines, control columns and stray fields from any other electric meters. A single electric meter with permanent magnets, can render a compass valueless.

Some sort of remote indicating compass was desired so that a more favorable magnetic location could be used. Such a favorable location may usually be found in the fuselage just forward of the tail, even though the members in the tail be of steel. These steel members do not distort the earth's field to any extent twenty-four inches from them, provided they are not permanently magnetized.

This need has given rise to the development of the earth inductor compass.

The earth inductor compass consists of a direct current armature of non-magnetic material and brushes. It uses the earth's horizontal component of field for excitation. The indicator is a sensitive microammeter with its zero position mid-way on its scale.

The rotor must be pendulously supported to keep its axis vertical so as to cut only the horizontal component of flux. If disturbed from this vertical position the rotor then has a voltage generated due to the vertical component of the earth's field. This voltage gives a false indication of direction.

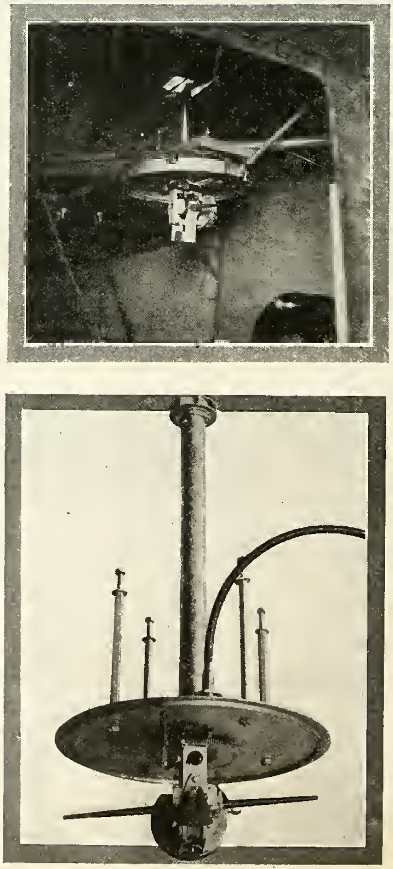
In this way it is subject to exactly the same acceleration errors as the card compass. The rotor is driven through universal joint. Since torque must be transmitted through this universal joint, it may become a source of error inasmuch as the rotor will tend to line up with the driving shaft, whether or not this is vertical.

To set a course the brushes are rotated to such a position with respect to the earth's magnetic field that the voltage generated in the various coils adds up to zero. As long as this course is maintained the indicator remains at zero. If the pilot deviates from the course to the right, the indicator has arbitrarily a positive current through it due to the new position of the brushes with respect to the earth's field. If the deviation from the course is to the left, the current is arbitrarily negative and the indicator so records.

The brushes are geared permanently to an azimuth ring graduated into points of the compass so that when the indicator registers zero, a glance at the azimuth ring indicates the position of the brushes and the course. The azimuth ring is located on the dash or within easy reach of the pilot. When the pilot wishes to change to a new course, he simply turns the azimuth ring on this dashboard to the desired indicated course. Through a flexible cable drive this shifts the brushes with respect to the earth's field. To bring the indicator back to zero, the brushes must be brought back to the same relative position with respect to the earth's field. This is done by changing the heading of the plane to the new course.

If the brushes are once set in position with respect to the azimuth ring and the fit of the brushes changes, then the actual position of contact changes and considerable error is introduced into the operation of the compass.

Criticism has been offered to the earth inductor compass because of the fact that there are two positions on the commutator where zero voltage is generated. The positions are 180



Earth inductor compass generating unit and (above) its installation.

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the Natural *Aviation Center*

offers the Ideal Location for Air-craft Manufacturers *and* Allied Industries

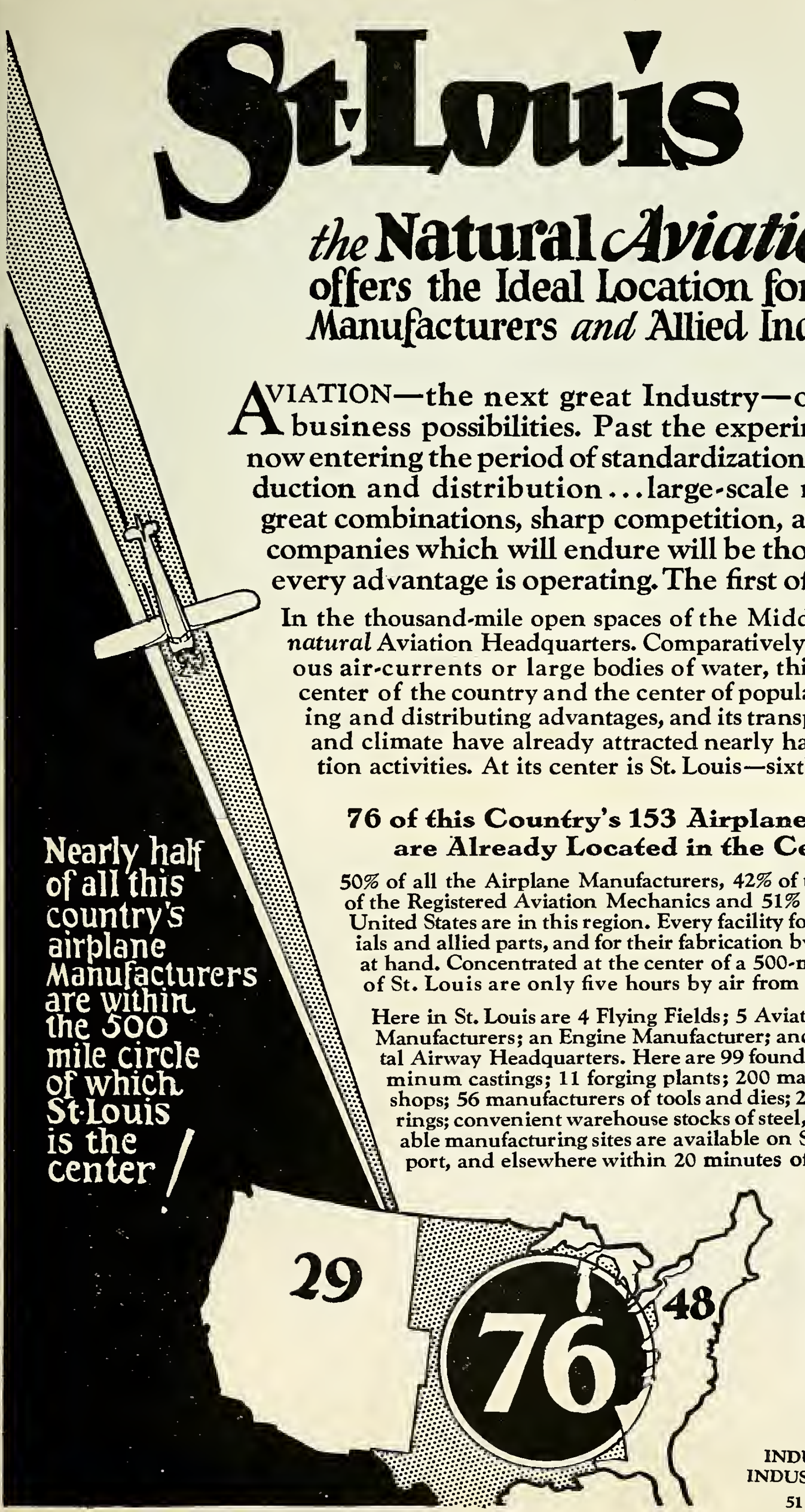
AVIATION—the next great Industry—offers tremendous business possibilities. Past the experimental stage, it is now entering the period of standardization. Problems of production and distribution . . . large-scale manufacturing . . . great combinations, sharp competition, are just ahead. The companies which will endure will be those in whose favor every advantage is operating. The first of these is *Location.*

In the thousand-mile open spaces of the Middle West is America's *natural* Aviation Headquarters. Comparatively flat, free from dangerous air-currents or large bodies of water, this great area spots the center of the country and the center of population. Its manufacturing and distributing advantages, and its transportation, topography and climate have already attracted nearly half this country's aviation activities. At its center is St. Louis—sixth manufacturing city.

76 of this Country's 153 Airplane Manufacturers are Already Located in the Central States

50% of all the Airplane Manufacturers, 42% of the Licensed Pilots, 44% of the Registered Aviation Mechanics and 51% of all the Planes in the United States are in this region. Every facility for the obtaining of materials and allied parts, and for their fabrication by men and machinery, is at hand. Concentrated at the center of a 500-mile radius, the resources of St. Louis are only five hours by air from nearly all this territory.

Here in St. Louis are 4 Flying Fields; 5 Aviation Schools; 4 Airplane Manufacturers; an Engine Manufacturer; and a great Transcontinental Airway Headquarters. Here are 99 foundries; 21 producers of aluminum castings; 11 forging plants; 200 machine shops; 34 pattern shops; 56 manufacturers of tools and dies; 2 manufacturers of piston rings; convenient warehouse stocks of steel, brass, aluminum. Desirable manufacturing sites are available on St. Louis' $2,000,000 Airport, and elsewhere within 20 minutes of the downtown district.


Nearly half of all this country's airplane Manufacturers are within the 500 mile circle of which St. Louis is the center!
29
76
48

St. Louis has interesting facts for the manufacturer of anything connected with aviation. Correspondence is invited from manufacturers, bankers, and business men. A special Aviation Survey will be made for those desiring it.

Write A-3

INDUSTRIAL BUREAU *of the*
INDUSTRIAL CLUB OF ST. LOUIS
511 Locust St., St Louis, Mo.

degrees apart. It might be supposed that if the aviator were flying absolutely blind he would not know from looking at the azimuth ring whether he was travelling in the indicated direction or 180 degrees in exactly the opposite direction, as his indicator reads zero in both directions.

However, if he is on the indicated course and not on the course 180 degrees therefrom, he has a very definite indication that such is the case. If he turns to the right the indicator travelling in the opposite direction and turns right, the indicator turns left. The explanation of this is quite simple to anyone familiar with direct current generators. A 180 degree shift of brushes could be effected simply by reversing the connection to them. For a deviation to the right of the plane, the current flows through the indicator in the opposite direction giving the reverse indication.

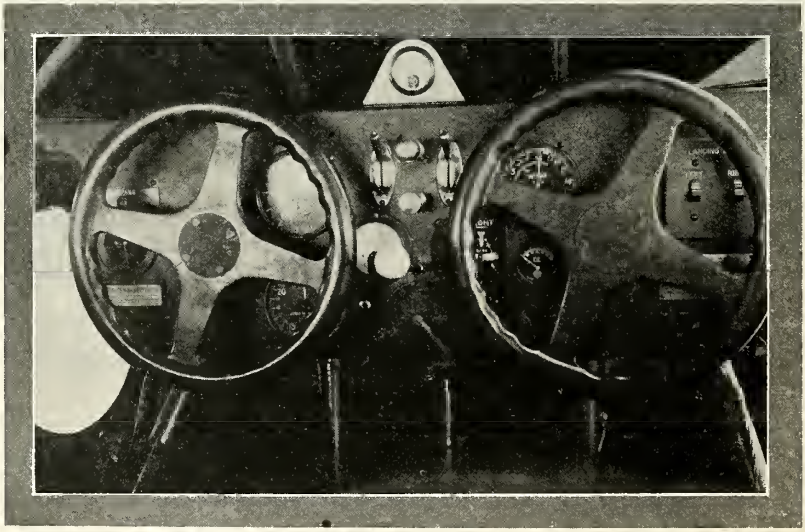
The two principal advantages of the earth inductor compass are that it may be located in a place free from the ship's local magnetic disturbances and that it is a very easy and satisfactory thing to steer by.

Keeping the little indicator pointer in the middle of the dial is much less wearisome than keeping the compass card on a bearing like 10 degrees south of west, for example.

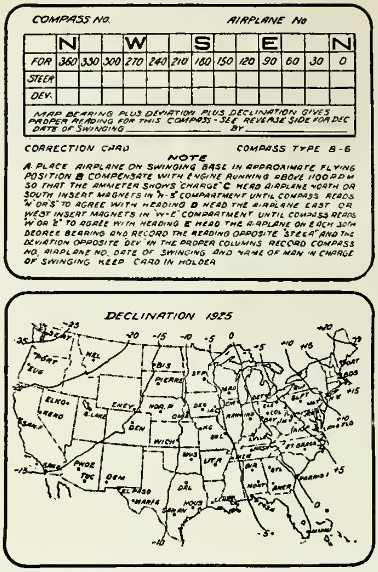
The disadvantages of the earth inductor compass are:

1. It requires a universal joint to transmit torque to the rotor. This universal joint must be well made if it is not to disturb the vertical position of the rotor.

2. The amount of voltage generated is very small and commutation difficulties are encountered. Lubrication is resorted to keep the commutator clean and to prevent excessive wear on the commutator. Neglect of this lubrication in proper amount caused the earth inductor compass fitted on the "Southern Cross" to become ineffective during the flight to Australia.


Test instrument panel in a Stinson airplane. Magneto earth inductor compass (top), azimuth crank (lower left) and magnetic compass (left)

3. It is a complicated and costly instrument. The armature has many thousands of turns of very fine wire wound upon a non-magnetic support made of wood or other suitable material. This gives it a high moment of inertia and makes it very cumbersome. The instrument adds considerable weight to the aircraft. It is also necessary to make the diameter of the rotating member large.


COMPASS NO. AIRPLANE No

	N			W			S			E			N
FOR	360	330	300	270	240	210	180	150	120	90	60	30	0
STEER													
DEV.													

MAP BEARING PLUS DEVIATION PLUS DECLINATION GIVES PROPER READING FOR THIS COMPASS - SEE REVERSE SIDE FOR DEC

DATE OF SWINGING ________ BY ________

CORRECTION CARD COMPASS TYPE B-6

NOTE

A. PLACE AIRPLANE ON SWINGING BASE IN APPROXIMATE FLYING POSITION B COMPENSATE WITH ENGINE RUNNING ABOVE 1100 R.P.M. SO THAT THE AMMETER SHOWS "CHARGE" C HEAD AIRPLANE NORTH OR SOUTH INSERT MAGNETS IN "N-S" COMPARTMENT UNTIL COMPASS READS "N" OR "S" TO AGREE WITH HEADING D HEAD THE AIRPLANE EAST OR WEST INSERT MAGNETS IN "W-E" COMPARTMENT UNTIL COMPASS READS "W" OR "E" TO AGREE WITH HEADING E HEAD THE AIRPLANE ON EACH 30TH DEGREE BEARING AND RECORD THE READING OPPOSITE "STEER" AND THE DEVIATION OPPOSITE "DEV" IN THE PROPER COLUMNS RECORD COMPASS NO. AIRPLANE NO. DATE OF SWINGING AND NAME OF MAN IN CHARGE OF SWINGING KEEP CARD IN HOLDER

A compass correction card showing tabular form for calibrations and (on reverse) a chart of magnetic declination for U. S.

4. It is subject to all the acceleration errors of the ordinary magnetic card compass, but due to its mechanical arrangement it lends itself to better damping. Also it may be subject to errors or possession due to gyroscopic action.

5. Errors due to brush fit are liable to occur.

The advantages of the earth inductor compass are very important ones and some way was sought to overcome some of its disadvantages.

It occurred to Dr. J. D. Tear of our Research Laboratory that the earth's field might be intensified or concentrated by means of some magnetic material such as iron. But iron has an extremely low permeability at the low magnetizing forces exerted by the earth's field. Worse still, once magnetized, it tends to retain this magnetism. It has a high coercive force. These considerations led him to the nickel-iron alloys such as permalloy which have the desired properties at low flux densities.

Permalloy has such a very great permeability that very small magnetizing forces induce fairly large concentrations of flux in the metal. And what is even more important, this strange alloy has negligible coercive force, that is to say, when the very small magnetizing force is removed from its vicinity, the magnetic flux disappears almost completely.

Herein lies the clever conception of this very original and important invention.

Dr. Tear proposed and developed an earth inductor compass using permalloy, a metal composed of 78.5 per cent nickel and the remainder iron.

This compass is called a "magneto" compass.

Let us assume that a bar of permalloy is stabilized in the horizontal plane. It is always necessary to exclude the vertical component in any type of magnetic compass. If the bar is pointing east and west, that is, if it is perpendicular to the magnetic meridian, the earth's field induces no flux in the bar along its length. If it is now deviated slightly from this east and west position, a flux is induced in the bar along its length. The intangible lines of force in the surrounding space are sucked into the permalloy and find the shortest and easiest path to be along the metal.

(*Continued on page* 254)

The plane sketched is a Buhl Sport Airsedan, carrying pilot and two passengers. It is licensed for either the Wright Whirlwind J-5 or J-6 engine

ONLY honest manufacture endures.

For 95 years the Buhl name has been identified with progressive industry. That is one reason the Buhl Aircraft Company has assumed a position of acknowledged leadership in aviation. Its planes carry far more than the name alone—they preserve the priceless heritage of almost a century of manufacturing integrity. Its sales and dealer policies are tempered by long experience and based on the sound business sense which assures profit.

We shall be pleased to mail our illustrated catalog of the complete line of Buhl Airsedans, or to forward details of our attractive dealer plan.

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BUHL *Aircraft Company*

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Buhl
Air Sedans
SENIOR·STANDARD·SPORT

AIRPORT AND AIRWAY

News of airlines, airports, and airways; radio, lighting and other auxiliary services

By
Edgar H. Felix

A Year of Achievement

NO evidence more eloquently bespeaks the amazing growth of air transport than the cold figures themselves. The Aeronautical Chamber of Commerce reports that the air transport companies of the United States carried 52,934 passengers in 1928 for a distance of 10,472,024 miles. This represents an increase of 100 per cent in mileage over 1927 and 420 per cent in passenger traffic. 23 new passenger lines, nearly 6,500 miles in length, were inaugurated or extended, while the number of new mail routes was 16 with mileage of 5,928. Air mail poundage tripled.

The regular report of airway and airplane mileage, published in the *Domestic Air News* of the Aeronautics Branch of the Department of Commerce for March 30, 1929, summarizes the significant figures as follows:

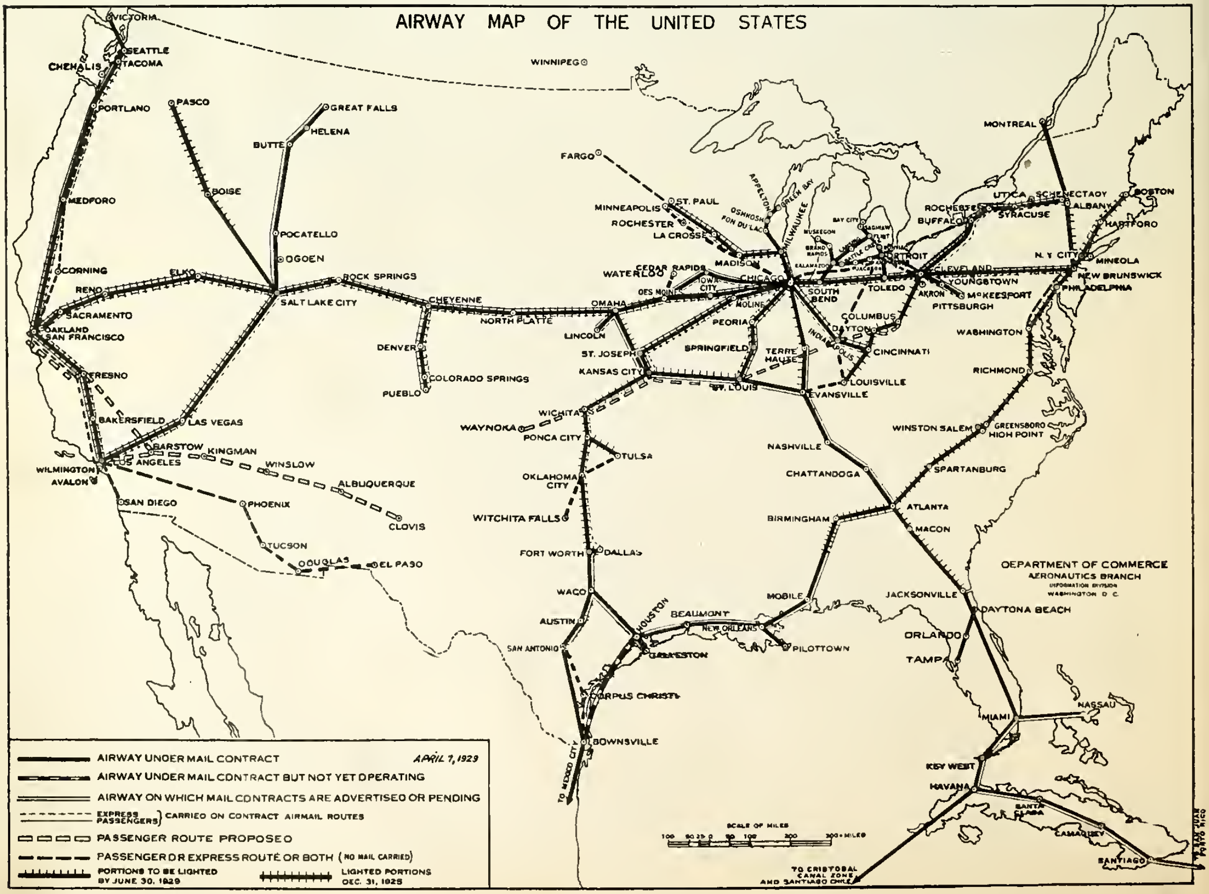
Miles of airways operating March 30, 1929	21,392
Miles of mail airways operating March 30, 1929	18,074
Miles of mail airways scheduled for early operation	4,376
Miles of other airways scheduled for early operation	2,161
Miles of all airways, operating or scheduled	27,929
Airplane miles scheduled daily (average) with mail	39,216
Airplane miles scheduled daily (average) non-mail services	18,300
Airplane miles scheduled daily (average) all services	57,516

Air mail contractors received $7,430,225 during 1928 from the Post Office Department for carrying air mail over a flying distance of 8,270,081 miles. Of this amount $2,326,400 was earned during the first half of the year and $5,103,825 in the second half.

Considerable disparity of earnings per mile flown, however, is revealed in a table in *Domestic Air News,* showing the mileage flown, poundage carried, total mail income and mail income per mile flown, from July to December inclusive. Salt Lake City-Los Angeles topped the lists with a mail income of $2.982 per mile, earned by carrying 260,043 pounds of mail for a distance of 261,247 miles. Cleveland-Pittsburgh followed with earnings of $2.834 per mile flown, with a total mail poundage of 45,624, carried for 49,347 miles. The Boston-New York route took in $2.063 per mile, with a total mileage of 59,328 and a poundage of 40,889. Chicago-St. Louis, Salt Lake City-Pasco, Chicago-San Francisco and New York-Atlanta earned amounts per mile between $1.07 and $1.39. The highest mileage and largest total earnings were attained by the Chicago-San Francisco route, flying 974,748 miles, carrying 672,344 pounds, and receiving therefor $1,360,979, an average of $1.396 per mile. The smallest earnings of the routes established in 1927 and still in operation are those of the Albany-Cleveland, which earned $.349 per mile flown. The only route to show decreased earnings per mile flown is Cheyenne-Pueblo, which fell from $.782 in 1927 to $.460 per mile earned during July-December, 1928. Practically all routes showed substantial increases in the periods compared.

THE rapidly expanding work of the Airways Division of the Department of Commerce is indicated by the program of

(*Continued on next page*)



AIRPORT BUILDING

is serious business requiring specialized knowledge.

CAPT.
HAROLD H. AMBLER

Commanding officer and builder of Orly Airdrome, one of the largest air fields in France during the Great War, is directing the airport activities for Leonard Macomber, Inc.

AIRPORT building, correctly done, requires the coordinated efforts of many specialists. Innumerable factors determine the fitness and success of any airport—factors of location, field layout, ground surfacing, drainage, location, construction and lighting of hangars, and many others. Each is a study in itself—each requires special knowledge, ability and experience.

With necessarily large tracts of land, large investments involved, poor judgment and errors are costly. This is no job for Jack-of-all-trades or Jack-of-no-trades. It cannot be done by unorganized individuals, each interested only in his part of the work. Teamwork and collective experience of a closely-knitted group of experts are vital for such undertakings.

The staff of Leonard Macomber, Inc., is composed of men aeronautically wise, picked because of their vision, their airport building experience and their ability to work together. This organization offers an unequalled service to City Officials, Associations of Commerce and individuals who are considering the construction or improvement of airports. This service, offered in whole or part, includes: site selection, field layout, marking, draining, grading, leveling, surfacing, runways, lighting, building and hangar engineering and construction, complete engineering and architectural service and consultation. Inquiries are invited.

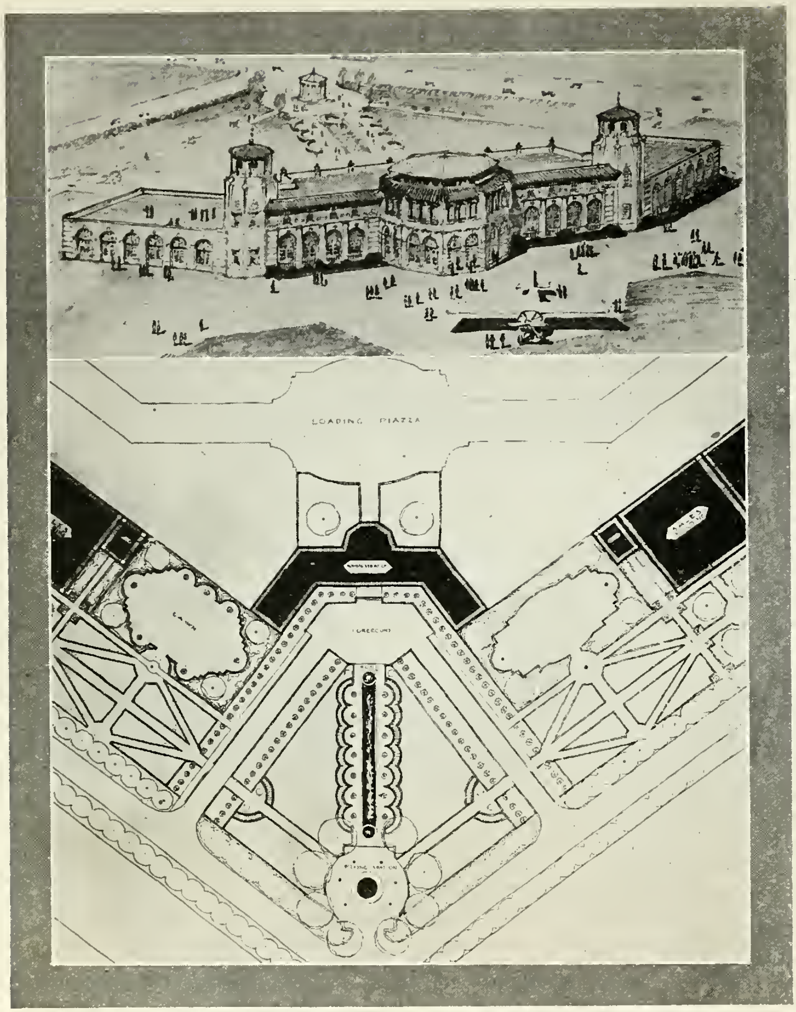
Design and construction by Leonard Macomber, Inc., is the best assurance that the completed airport will receive the highest possible government rating.

We retain as consulting architects, Childs & Smith, and as structural engineer, F. W. Seidensticker.

LEONARD MACOMBER, INC.

Airport Engineers and Builders

664 North Michigan Ave., Chicago, Illinois



Landscape layout and sketch of buildings at Fairfax Airport, Kansas City.

(*Continued from preceding page*)

expenditures planned for the fiscal year ending June 30, 1930. The total maintenance charge for the fiscal year 1930, exclusive of maintenance on the new construction, will be $2,770,500 as compared with $1,752,840 for the previous year. A total of 3,900 miles of airways will be lighted for night flying at a cost of $1,228,500 or $315 per mile. The maintenance for four months, at a rate of $195, will total $285,187. Nineteen additional radio-beacon and communication stations, at a cost of $24,000 each, or a total of $456,000, with an additional maintenance cost of $12,000 per annum, are included in the cost of new construction. The total for additional construction and maintenance for the fiscal year 1930 is estimated at $2,064,687, the outlay for 1929 being $2,302,500. The 11,500 miles of lighted airways already built will require a total of $2,242,500 for maintenance as compared with just under one and a half million for the previous year. The maintenance cost for radio stations will rise from $288,000 for 24 stations in 1929 to an outlay of $528,000 for 44 stations.

These figures tell only a part of the story of growth because they do not indicate the enormous increase of investment in equipment, airport development, and personnel required to make possible the mounting mileage and poundage. But, if any one agency is to be given credit for this expansion, it is the Aeronautics Branch of the Department of Commerce and the public support which has made its activities possible.

Air Mail Services Expanding

ANNOUNCEMENT of increased air mail services is becoming a matter of almost daily occurrence. The most significant recent development is the inauguration of the night transcontinental service, which brings the Atlantic Seaboard and the Pacific Coast twelve hours closer. Westbound mail will leave New York City at 8 p.m., Hadley Field, N. J., at 9:35 p.m., reaching the west coast on the second morning following, Los Angeles at 4:15 a.m. and San Francisco at 4:30 a.m. Eastbound mail, leaving Los Angeles at 7 p.m. and San Francisco at 8 p.m., is scheduled to arrive at New York at 6:45 a.m. the second morning following.

Substantial extensions to the Western Air Express network of passenger and mail routes will be in operation shortly after May 1. The airway will extend from Los Angeles to Holbrook, Ariz.; Albuquerque, N. M.; Amarillo, Texas; Wichita, Kans., and into Kansas City, and the present Cheyenne-Pueblo line will be extended so as to make connections with the Kansas City-Los Angeles route at either Amarillo or Albuquerque. Passengers on crack Rock Island trains will be transferred to planes at Kansas City and Amarillo through arrangements concluded with that system. Amarillo will also be a port of call for Santa Fe passengers. The new routes will be flown daily with trimotor Fokkers, of the type now being used by Western Air Express on the San Francisco-Los Angeles-Salt Lake City routes.

The new 403-mile St. Louis-Omaha air mail route, connecting with the new night transcontinental service, to be operated by the Robertson Aircraft Corporation, places St. Louis within twenty-four hours of San Francisco and Los Angeles. The Cleveland-Pittsburgh feeder route, operated by Clifford Ball of Pittsburgh, will also add a night service to connect with the new schedule. The Albany-Cleveland route of Colonial Western Airways will be changed to leave Albany at 3:40 p.m. instead of 10 a.m. in order that a day's accumulation of mail may be delivered for the night plane at Cleveland.

Concurrent with this improved transcontinental service, routes north and south have also increased. With the actual inauguration of Contract Air Mail No. 25, a continuous eastern seaboard route, stretching from Montreal to Miami, has been completed with a total mileage of 1,746, operated on a flying time schedule of 17 hours and 45 minutes. Due to the large number of tourists in Florida during the winter season, Pitcairn Aviation reported an increase of mail poundage carried of 60 per cent in February over January and 110 per cent over December, the first month of the Jacksonville-Miami service. The actual poundage carried was 10,000.

As the number of contract routes increases, the bidding for them becomes more spirited. For instance, four bids were received by the Post Office Department for the New Orleans and Pilottown 110-mile air route, $100, $105, $128 and $245 per round trip having been offered. It seems probable that all the major routes will soon have several daily schedules, not only increasing the amount of mail carried and the speed with which it is delivered, but improving the connections made with feeder routes.

New Transport Routes

MANY shorter passenger and mail routes are being inaugurated or extended. Starting April 15, two round trips are being made between Newark Municipal Airport and Boston by the Colonial Air Transport. Trimotor Ford planes with Pratt and Whitney Wasp engines are used. Planes leave each terminal at 10 o'clock in the morning and return at 4:30 in the afternoon. The schedule in both directions is less than two

(*Continued on next page*)

That the bird may fly again

From a soft wet field this plane had no chance to "take off". The sure-footed "Caterpillar" Tractor came to rescue—

pulled 7,500 pounds of airplane from the clutches of the mud. Wherever plentiful power and generous traction are essential for out-door tasks you will find "Caterpillar" Tractors the world over *doing the job* economically, quickly and efficiently.

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EXECUTIVE OFFICES: SAN LEANDRO, CALIFORNIA
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Holt Combined Harvesters · Russell Road Machinery
"Caterpillar" Tractors

CATERPILLAR
REG. U.S. PAT. OFF.
TRACTOR

(Continued from preceding page)

hours between the two Atlantic Coast cities.

Mr. George R. Hann, president of the Pittsburgh Aviation Industries Corporation and director of the Aviation Corporation, has announced that a three-hour air passenger service betwen New York and Pittsburgh is soon to be inaugurated. A 600-acre tract has been bought for the construction of a landing field at Pittsburgh. The city of Philadelphia has announced, through its New York representative, that a thirty-minute air service is to be established between the two cities. The new Camden airport is to be the Philadelphia terminus and the New York end of the route is to be announced later.

The widespread use of airplane passenger transportation in Texas and Oklahoma is indicated by the report of the Braniff Airlines on its Oklahoma City-Tulsa Division. Three round trips are made daily, the plane leaving each end of the division at 8 a. m., 12:20 p.m. and 5 p.m. During the first 15 days of March, 280 paid passengers were carried in this service. Incidentally, the Braniff Air Lines have recently been purchased by the Universal Aviation Corporation. Ships on the Braniff lines now fly an average of 1,000 passenger miles per day and their record for total passenger miles flown—more than 300,000—is exceeded by only one company in the United States. There has never been an accident on the lines.

Colonel Paul Henderson announced recently, in behalf of Transcontinental Air Transport, that the transcontinental air-rail passenger service between New York, San Francisco and Los Angeles will be inaugurated July 1st, following a two weeks training period. The schedule submitted to the Department of Commerce for this service calls for a westbound journey between New York and Los Angeles in 51 hours, 52 minutes, and an eastbound journey in 46 hours, 18 minutes.

Foreign U. S. Air Mail Services Progressing

NORTHBOUND air mail, carried between Havana and the United States, now outweighs that carried on ships. 24 hours is saved in the delivery of mail by air. During the first 30 days of its operation, the new mail and passenger line connecting Miami with Havana and Nassau, carried 772 passengers and 15 tons of mail and flew a total of 73,000 miles.

During February, Pan American Airways, Inc., carried 1,540 passengers (an increase of 95 per cent over the preceding month) and 97,254 miles were flown between Miami, Nassau and the Antilles.

With the inauguration of the Texas Air Transport Company's lines to Brownsville, Mexico City is now but 36 hours by air from New York City, as against ten days required by ordinary first class mail, and service to Chicago and the principal cities of the Middle West is on a 24-hour basis. Due to the temporary disruption of regular railroad service from Laredo because of the revolution, the new airline, conducted by Pan American Airways, Inc., is the principal direct transportation system between the United States and Mexico City. During the first week's operation of the new line, it was necessary to operate two and three planes in each direction, and the demand for passenger accommodation has been heavy. Trimotor Fords, radio equipped and powered by Wasp engines, are used.

New York and Philadelphia Grapple with Airport Problems

THE New York metropolitan area's airport problem is likely to find solution in one or more of the various projects which are being pushed by financiers. Roosevelt and Curtiss Fields are being combined under the auspices of the Aviation Corporation, making one of the largest fields in the world. Bus transportation, utilizing the Motor Parkway, will be provided to the Jamaica railroad terminus, which has hundreds of trains daily to and from New York. Construction work has already begun on the steel and concrete hangars large enough to house 250 planes. The historic Curtiss Field signs have been taken down and great activity is being manifested in making the combined Curtiss and Roosevelt Fields the most modern and completely equipped in the world.

At the same time, the New York Air Terminals, Inc., is developing a land and seaplane port in the New Jersey meadows near Secaucus, bordered by the Pennsylvania; Delaware, Lackawanna & Western and Erie Railroads; a site of 273 acres has been purchased with 165 additional acres under contract. A seaplane basin will be constructed on the northeasterly side, with a depth of 45 feet and an area of 56 acres, enabling seaplanes and amphibians to have a 3,000-foot run. Mail can be delivered to the New York post office through the Hudson Tubes in 12 minutes. These projects, together with the proposed Holmes Airport and the Barren Island site, as well as the Newark Airport, should provide the New York Area with ample facilities.

Mayor James J. Walker of New York City has appointed an airport committee, including Charles F. Kerrigan, assistant to the mayor; Mr. Tuttle, Commissioner Cosgrove, Clarence D. Chamberlin, the city's airport consultant; Senator Robert F. Wagner, Major J. Dwight Black of Brooklyn; Harry F. Guggenheim, president of the Daniel Guggenheim Fund for the Promotion of Aeronautics; Frank Tichenor, publisher of AERO DIGEST; W. J. L. Banham, president of the New York Board of Trade and Transportation, and Ralph Jones, former president of the Brooklyn Chamber of Commerce.

Philadelphia, at the same time, is witnessing the promotion of seven airport projects. Alexander Murdoch, Director of Public Works, favors the Hog Island site and is said to have the support of Lieut. Col. Blee of the Department of Commerce. That location comprises 925 acres, of which 200 acres, constituting the present municipal airport, are owned by the city.

A report, prepared by Kern Dodge, engineers, supporting the Regional Air Terminal for the Philadelphia region, is a model of comprehensive analysis of air terminal facilities for a metropolis. Mr. Dodge's bulletin, dated February, 1929, analyzes in detail the advantages of the proposed site for the Philadelphia Air Terminal, along the Delaware River and bordering on River Road which reaches northward from the center of Camden. It is but fifteen minutes motoring distance from Philadelphia City Hall. His supplemental report, issued March, 1929, gives a rating schedule for the seven airport sites under consideration, based on 36 salient points, determining the practical value of an airport. The form of these reports may be profitably studied by any commission or airport engineer considering the relative value of several sites. Mr. Dodge bases his valuation ratings upon an article written by P. A. Fellows, City Engineer, Detroit, Mich. appearing in a recent issue of *Engineering News Record.*

Other Airport Developments

A GIANT airship hangar which is being erected by the Goodyear-Zeppelin Corporation at Akron, Ohio, will be the world's largest building from the standpoint of unobstructed floor area, being 389,000 square feet It will be 1,200 feet long, 360 feet wide and 200 feet high and will cost $2,500,000. Two doors at each end, weighing 800 tons and running on 40 wheels, will be electrically controlled and stopped with special electro-hydraulic brakes.

ONE of the finest airports on the southern transcontinental route is the Albuquerque Airport, southeast by east of Albuquerque, five miles from the railroad station and 5,400 feet above sea level. The field is about 160 acres and is approximately square, with four 500-foot wide runways, two of which are 3,300 feet long and two 2,600 feet long. There is a 60 by 80 foot steel hangar and comfortable administration buildings. The southern transcontinental route is likely to carry increasingly heavy traffic because of the higher average temperatures and the fact that at no point need the pilot rise above 10,000 feet. Art Goebel, who formerly held the transcontinental non-stop record, is a strong proponent not only of this route, but of the Albuquerque Airport itself.

ONLY 1,544 square miles would be required to build landing fields of intermediate size with 1200-foot runways, ten miles apart, all over the country, according to a statement by Harry F. Guggenheim, president of the Daniel Guggenheim Fund for the Promotion of Aeronautics. If airports were so located, a plane flying at an altitude of four or five thousand feet would rarely be out of gliding distance from an airport. As against this area of 1,544 square miles, the total land occupied by railway rights of way in use and by station property is estimated at 21,550 square miles, while a conservative estimate of the mileage devoted to roads and highways is 28,500 square miles. To provide landing fields every ten miles

(Continued on next page)

Native-Lake Asphalt runways, floors, and roofs for use in airport construction

The unusual wear and weather resisting qualities of Native-Lake Asphalt have been proved through a half-century of use as paving material in all parts of the world. This wonder of Nature, dug from the surface of Trinidad and Bermudez Asphalt Lakes, has also thoroughly demonstrated its value for use in flooring for large areas and in protective roofing through long years of service.

These Barber Asphalt Products adequately meet the needs for runways, floors, and roofs in airport construction, and are particularly recommended when long life and low maintenance costs are required.

FOR HANGAR FLOORS

Genasco Asphalt Mastic is the ideal flooring for hangars. It is resilient—stands up under the wear and tear, and gives lasting service. It is sanitary, non-absorbent, free from dust, and easy to keep clean.

Genasco Asphalt Mastic is made from Native-Lake Asphalt combined with suitable amounts of filler and sand. Easily and quickly laid, in one continuous unbroken sheet—as a new floor or over old floors—and it is ready for use in a few hours. Genasco Asphalt Mastic may be laid over wood, concrete, or brick, provided the foundation is solid and there is no excessive vibration.

FOR HANGAR ROOFS

Genasco Roll Roofing and Genasco Standard Trinidad Built-Up Roofing are two types of roofing which offer complete weather protection for hangars.

Genasco Roll Roofing gets its unsurpassed waterproofing, wear and weather resisting qualities from Native-Lake Asphalt Cement. The backbone of this roofing is tough, rag felt, selected because of its great tensile strength and power of absorbing the waterproofing saturant. Genasco Roll Roofing is made with smooth surface and also with slate surface. The latter is available in four unfading colors—Red, Green, Blue-Black, or Mix-Tone—and has the additional advantage of being fire-retardant.

Genasco Standard Trinidad Built-Up Roofs offer still greater durability. The layers of thoroughly saturated long-fibred, all-rag felts, are bound together by Native-Lake Roofing Asphalt, and result in a roof that is noted for its long life and low maintenance cost.

FOR AIRPORT RUNWAYS

Trinidad and Bermudez Native-Lake Asphalts are used for street and road building all over the world. The best form of construction for airport runways at a reasonable cost is Bermudez penetration macadam.

The resiliency of Native-Lake Asphalt makes it withstand the shock from landing planes, and its surface can be finished either smooth or as rough as desired, to assist in preventing skidding.

Native-Lake Asphalt has proved its ability to stand the severest usage and is attractive, dustless, noiseless, and easy to keep clean and in repair.

Write us today for full information regarding all these Native-Lake Asphalt products. We will gladly tell you all about their advantages for airport runways, for hangar floors, and for hangar roofs. Mail the coupon today!

THE BARBER ASPHALT COMPANY

New York Chicago Pittsburgh PHILADELPHIA St. Louis Kansas City San Francisco

Barber Asphalt Products

AD 5

THE BARBER ASPHALT COMPANY,
Philadelphia

Please tell us more about Barber Asphalt Products for use in airport construction.

Name ....

Address ....

....

(*Continued from preceding page*)

in New York State would require only 560 fields, which is less than the number of golf courses in the state.

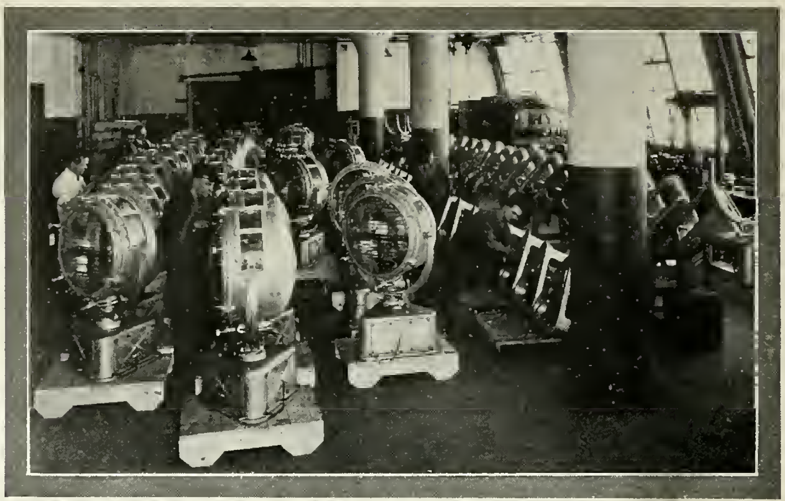
Model Airport Construction

DESIGNING not only from the utilitarian standpoint but with a keen conception of the requirements of artistic and architectural beauty, the Wood Brothers Corporation through its subsidiary, the Fairfax Airport Company, is building up a 1,000-acre airport at Kansas City. The first two units of the airport development to be started are the administration building at the southwest corner of the field and the first of the sales and service buildings, four of which will eventually be erected. Construction work on the new buildings, which will be of Spanish brick and tile style, was to have started April 1. An extensive program of landscaping is being entered upon under the direction of Ernest Herminghaus, a landscape architect, who has toured Europe to study landscaping from the aerial viewpoint. The landscaping treatment of the field border will center around a mirror pool and fountains at the corner of the field, with sunken garden effects on either side, spreading out into diamond and rectangular patterns of privet hedge, Monterey pines and Moline elms, making this one of the most picturesque airports at which to land in the United States.

From the utilitarian standpoint, an immense concrete apron, 40 feet wide and 5,000 feet long, is to be laid. The Porterfield Flying School and the Curtiss Flying Service are among the prospective users of the field.

COLONIAL Air Transport has begun construction of a $125,000 hangar at Boston which will have accommodations for three hundred passengers and visitors. The building, designed by George S. Bartlett, is built of Roman stucco with steel reinforcement. The building will be ready June 15. It has a frontage of 200 feet and a depth of 147 feet, giving it sufficient size to accommodate 25 passenger and mail planes, with a complete operating shop and full equipment for repairs and overhaul. Special underground passages will connect the street entrance of the building with the passenger rotunda, where there are a comfortably fitted lounging room, ticket offices and entrance to a small garden on the field, properly fenced to protect passengers from coming in contact with moving planes. Covered passageways will lead directly from the passenger rotunda to the planes, where passengers will embark after all mechanical arrangements for the flight have been made. The second floor of the building will be fitted with bedrooms, providing overnight accommodations for six pilots. Offices for company officials, field manager and meteorological experts are provided.

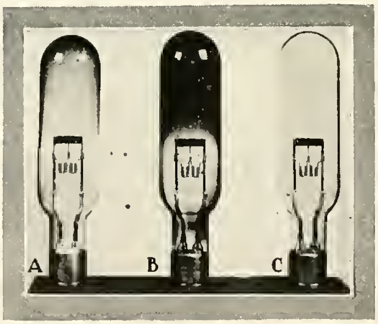
Progress in Airport Lighting



Department of Commerce airway beacons at the Sperry factory in New York.

WHEN Beacon No. 25 at Miriam, Nevada, on the San Francisco-Salt Lake City Airway was turned on, January 29, 1929, the final unlighted gap in the transcontinental airway was closed. 7,566 miles of the 20,788 miles of the 63 airways now being flown in the United States with mail, passengers, freight or combination, are lighted. The equipment of these lighted airways includes 320 lighted intermediate fields 1,269 rotating or flashing beacon lights with upper air observers, weather reporting and distributing stations, radio telegraph, radio telephone and land telephone communications and radio direction installations. Under contract are 2,001 miles of lighting with 49 intermediate fields and 244 beacon lights. Bids have been opened for lighting the New York-Albany airway, while the Chattanooga-Nashville section of the Atlanta-Chicago airway is soon to be in a similar state. The Selma-Anniston-Atlanta section of the New York-Atlanta airway has its construction work under way and completed with the exception of one intermediate field at Selma, Alabama. This route should soon be in operation.

AIRPORT lighting is given a new impetus by a recent development in incandescent lamp construction just completed by the Incandescent Lamp Department of the General Electric Company. The new construction provides a method for removing the blackening which forms inside the bulb as the lamp is burned, and makes it possible to increase tremendously the light output of large lamps without sacrificing their period of useful service or employing a larger bulb. The novel discovery greatly simplifies the bothersome problem regarding the ratio of lamp wattage to bulb size. Included in the bulb of the new lamps is a small quantity of scrubbing powder which cleans the bulb simply by giving it a few turns—a five second operation, and the lamp is restored to almost a new condition. The result is that the filaments can be designed to operate at a luminous efficiency closely comparable with that of the brightest known light source or even higher in some of the very high wattage lamps.



A new type bulb developed by General Electric has self-cleaning feature.

Lamps "A" and "B" have burned for equal periods. Lamp "B" was purposely made a poor lamp as evidenced by excessive blackening. Lamp "B" contains the cleaning powder. Lamp "C" is lamp "B" after cleaning.

Bureau of Standards Experiments

THE investigation conducted by the Bureau of standards on the visibility of neon lamps through fog is to appear in an early number of the Bureau of Standards Journal of Research. The general conclusion of the report is that the tests did not demonstrate any special superiority of the neon lamp over a beam of the same color secured from an incandescent lamp by means of a red glass filter.

Experimental work at the Bureau's Radio Laboratories is in progress on a visual radio beacon indicating twelve courses at angles of approximately 30 degrees. A vacuum tube driven tuning fork is used for controlling the modulating frequency distributed in each of the twelve directions. A visual type automatic indicator is to be used aboard the planes to indicate which of the 12 courses is being followed.

Radio Equipment to Be Compulsory

A PROPOSED regulation by the Department of Commerce has been submitted to the air transport companies, requiring that all transport planes, carrying passengers for hire over civil airways within the United

(*Continued on next page*)

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(*Continued from preceding page*)

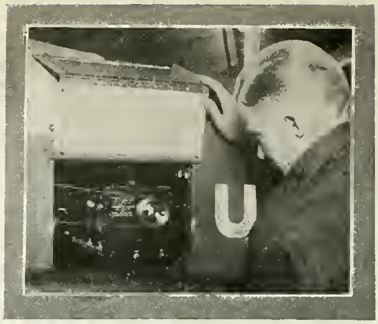
States, carry radio receiving and transmitting equipment, permitting communications with airway radio stations while in flight or in the event of forced landing, and the reception of the hourly weather report broadcast by airway radio stations and to provide a means of communication between these stations and planes in transit so that orders for the protection of planes and passengers may be transmitted while the planes are in flight. The proposed regulations also call for a radio officer among the complement of the large transport planes and require a constant radio watch to be maintained while in flight. Aircraft radio operators would be required to have a total of not less than twenty hours of flying and to demonstrate their ability to stand a watch on aircraft.

Operators Oppose Underwriters' Regulations

SPIRITED opposition developed at the conference sponsored by the Aeronautics Branch of the Department of Commerce to the final draft of the proposed fire code for aircraft hangars submitted by the National Board of Fire Underwriters, especially to that feature requiring the installation of sprinkling systems in hangars exceeding 10,000 square feet floor capacity. J. Brooks Parker of Philadelphia, representing Pan American Airways, Western Aircraft, Fokker and Keystone, deserted the conference when informed by the underwriters that this requirement would not be relinquished. Virtually the entire industry protested this proposed feature of the code, claiming that it had not been demonstrated that sprinkler systems would be effective in aircraft fires. Protests were also lodged against the severity of the regulations requiring repair, paint and woodworking shops to be separated by fireproof walls from storage hangars.

The Federal Radio Commission's Aircraft Hearing

THE only serious question which arose at the Federal Radio Commission's hearing on aircraft allocations with respect to the Air Transport Operators' recommendations had to do with their administration of their proposed radio communication system. The Air Transport Operators propose that the individual air transport lines may erect radio stations at any airports which they use and that the cost of their maintenance will be divided among the several lines using the the terminus. If additional services are inaugurated, using an airport already having such jointly operated radio facilities, the operators agree that they will be served with radio communication without discrimination provided they contribute their share of the cost of station maintenance. It appears that some members of the Federal Radio Commission, recalling their experience with the newspaper-radio allocation snarl, feel that this plan of operation would be feasible only during the pioneer stages, while radio facilities are not burdened with congestion.



Radio receiver installation in N.A.T. mail plane, just to the rear of the pilot's cockpit. The cable extends to the remote control tuning dial.

The operators' plan is a practical method of gaining immediate installation of radio transmitting equipment and securing the most rapid development of radio communications. Complications are in sight, however, when the number of airlines operating from any point becomes too numerous and when private planes also employ radio communications extensively. When heavy radio traffic becomes the rule, preferred service will inevitably be given to the planes of the transport lines which installed the original equipment and practical difficulties may arise which suggest the ultimate superseding of this arrangement by an independent aircraft radio communications service. The important point which the Air Transport Operators wished to secure at this time is that aircraft radio communication does not become a source of profit to an outside company but that, as far as is possible, the service be maintained at cost.

The Air Transport Operators have shown a most commendable attitude of coöperation and joining of counsels which should result in rapid progress in aircraft radio communication. Whatever inherent shortcomings exist in the present plans for communication organization will certainly be readily adjusted by that same spirit of goodwill now prevailing.

THE Continental Air Transport Company, Inc., obtained construction permits from the Federal Radio Commission to build eight land stations. These permits are issued with the understanding that actual licenses may not be granted if the Department of Commerce takes over air service allocation as has been suggested to the Commission by its engineering division.

Airport Equipment

A SPECIAL door for airplane hangars is being produced by the Truscon Steel Company of Youngstown, Ohio. The frame of the door is of heavy gauge tubular copper alloy steel, mitred and reinforced at the corners and electrically welded at all joints, or, if preferred, structural steel shapes may be substituted for tubes in the frame. The lower sections are solid steel panels, made from cold-rolled copper alloy sheets, full pickeled, reannealed and leveled. These doors are equipped with Timkin roller bearing trucks, operating on tracks embedded in the concrete floor, rather than on the conventional overhead tracks. Alemite lubrication maintains these trucks in easy operation, and one man can easily close or move a 20-foot leaf, 35 feet high and weighing seven tons, such as is used at the airplane assembly building at Wright Field.

UTILIZING Caterpillar tractors equipped with a snow plow, the Cedar Rapids Airport kept its three runways, each 90 feet wide and 2,000, 2,200 and 2,600 feet long respectively, cleared of snow, reducing landing hazard practically to normal. Effective snow removal equipment is a necessity at any airport where snowfall at any time is likely to constitute a landing hazard.

CLAUDE NEON LIGHTS, INC., of New York City, has issued a leaflet describing its neon beacon, meridian arrow, airways signs, boundary markers, glow beacons, landing beams, and obstruction lights. At the Croydon Aerodrome at London, the marker beacon consists of twenty Claude Neon tubes, each 20 feet long.

Weather broadcasting and radio directional transmitting installation operated by the Department of Commerce at Cleveland Airport.

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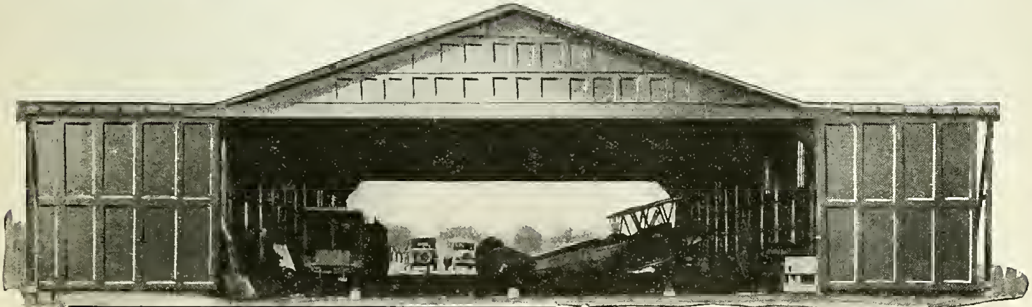

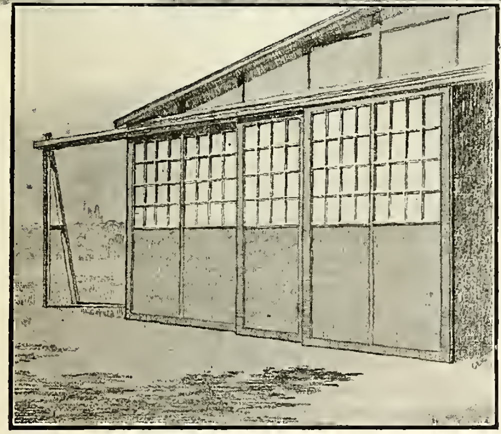

Types and Sizes of Truscon Hangars and Steel Doors for every requirement.

These fireproof Truscon Hangars have unobstructed floor space and full opening doors to insure utmost ease in handling airplanes. They are designed to meet individual conditions, with machine shop attached if desired. Truscon Hangars are fireproof throughout, with steel windows, steel doors and insulated Steeldeck roofs — all manufactured completely in the Truscon plant. Prompt delivery, quick erection and economical cost insure all-round satisfaction and greatest value. Write for suggestions and quotations.

STEEL HANGAR DOORS

Truscon furnishes steel hangar doors adapted to any type of construction or hangar design. They are sturdily built of quality workmanship, operate easily and offer minimum interference to the movement of airplanes. Both straight and curved track types are available. Write for full information and literature.

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THE AIR SERVICES

ARMY ENTRIES IN NATIONAL BALLOON RACE

THREE 35,000-cubic-foot balloons will represent the Army Air Corps in the National Elimination Balloon Race to be held in Pittsburgh, May 2 to 4. These balloons will be piloted by Capt. Wm. J. Flood, Capt. E. W. Hill, and 1st Lieut. L. A. Lawson, who will be accompanied by 2nd Lieut. Uzal G. Ent, 1st Lieut. R. S. Heald, and 1st Lieut. E. M. Fogelsonger as aides.

PACIFIC NAVY DIRIGIBLE BASE

SAN DIEGO voted a $250,000 bond issue on April 2 to purchase 1,000 acres for the purpose of creating a municipal airport for dirigibles to be offered to the Navy Department for the location of its Pacific lighter-than-air base. The base will cost $5,000,000, of which $2,000,000 is available. The city has a large acreage under option at Camp Kearny, which is the war-time training camp of the 40th Division, and if the Navy accepts the offer of a site for its Pacific coast dirigible base for the ZRS-4 and the ZRS-5, the land will be purchased and the city will proceed with its development.

The property is already used as an auxiliary landing field for the aircraft squadrons of the battle fleet when operating from North Island. The proposed site, which contains nearly 1,000 acres of level land with a sewage system sufficient for a population of 30,000, and pavements, drainage and public utilities, is situated fourteen miles from San Diego by paved highway, and is only a short distance in from the ocean. There are no high hills for many miles around. The comparative absence of fog and average wind velocity of only six miles an hour are believed to make this an ideal site for the operation of dirigibles. It is near the Naval Air Station on North Island, and other Naval developments at San Diego.

D.F.C. TO LT. EIELSON

FIRST LT. C. B. EIELSON, Air Corps Reserve, was decorated with the Distinguished Flying Cross recently by Assistant Secretary of War for Air, F. Trubee Davison, for his flight across the North Pole with Capt. Sir George Hubert Wilkins.

PERSONNEL SERVICE ON BOARD THE "LOS ANGELES"

IN closing out records of the personnel of the *Los Angeles*, Navy dirigible, at the end of the calendar year, it was found that the total flying time of the crew was 51,001.10 hours, and that of the officers, 21,985.08. The average flying time of the crew was 1,085.13 hours, of which the lowest was 3.16 hours and the highest 3,681.08 hours. Of the officers, the highest was 3,681.08 hours, and the lowest 349.16 hours, the average being 1,998.64 hours.

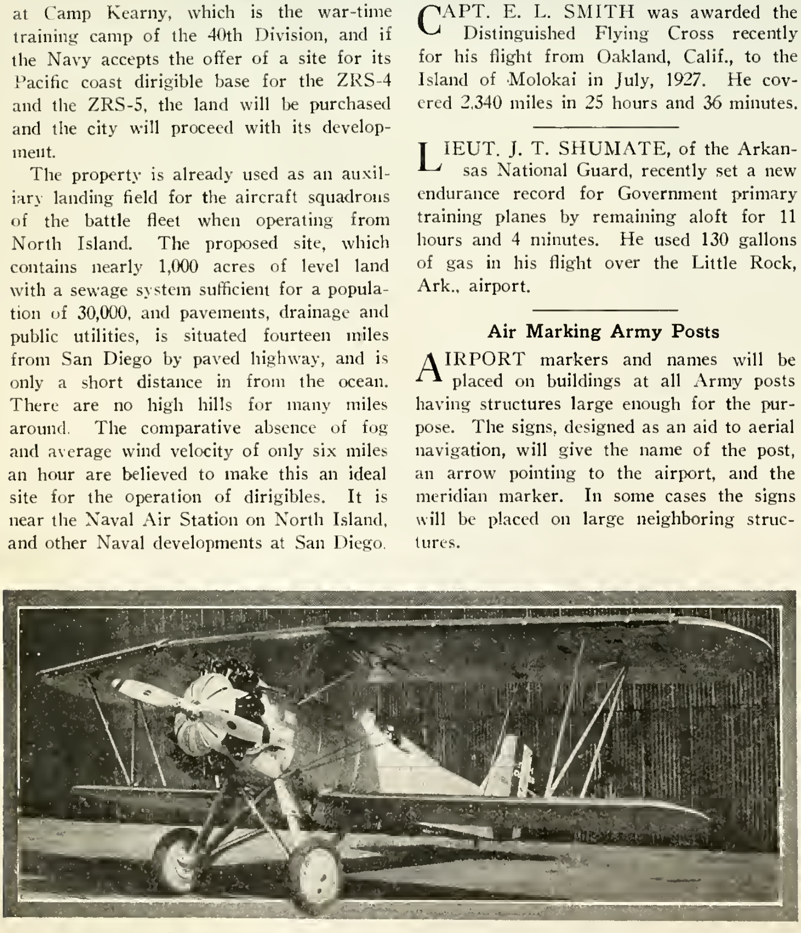
D.F.C. TO CAPT. SMITH

CAPT. E. L. SMITH was awarded the Distinguished Flying Cross recently for his flight from Oakland, Calif., to the Island of Molokai in July, 1927. He covered 2,340 miles in 25 hours and 36 minutes.

LIEUT. J. T. SHUMATE, of the Arkansas National Guard, recently set a new endurance record for Government primary training planes by remaining aloft for 11 hours and 4 minutes. He used 130 gallons of gas in his flight over the Little Rock, Ark., airport.

Air Marking Army Posts

AIRPORT markers and names will be placed on buildings at all Army posts having structures large enough for the purpose. The signs, designed as an aid to aerial navigation, will give the name of the post, an arrow pointing to the airport, and the meridian marker. In some cases the signs will be placed on large neighboring structures.



Curtiss Navy Seahawk equipped with slotted wings.

NAVY AVIATION TRAINING

CANDIDATES for Naval Aviators are selected from graduates of the Naval Academy at Annapolis, Maryland, who volunteer for flying duty. These candidates are required to submit to a rigid flight physical examination, and, if they pass this successfully, they are sent to the Naval Air Station, Pensacola, Florida, for training. The ground and flight courses include theoretical and practical flying in both seaplanes and landplanes, and theoretical and practical gunnery, bombing, navigation, radio, etc. If the candidate successfully completes this course, he is designated a Naval Aviator.

There are also flying ratings of Chief Aviation Pilot and Aviation Pilot First Class, which are held by enlisted fliers on active flight duty. To qualify for these ratings, a candidate must be under twenty-nine years of age, must be physically qualified, temperamentally adapted for aviation training involving actual control of aircraft, must have a good record and character, must possess a working knowledge of arithmetic, English and composition, and must first enlist in the Navy for general service; that is, no promises whatsoever can be given at time of enlistment as to the duty an enlisted man will be called upon to perform. After enlistment the recruit is sent to one of the four training stations where he is taught the general requirements of Naval life for a period of eight weeks. During this period the candidate for aviation is studied and examined with regard to his fitness for further training in aviation.

From among those at the training station who qualify in accordance with the above, a limited number, not exceeding five, are selected weekly from each of the four training stations after competitive examination for training in aviation, and are then sent to Hampton Roads, Virginia, or San Diego, California, for an elimination test. Those who successfully pass this elimination test are next sent to Great Lakes, Illinois, for a course of ten weeks at the Aviation Utility School. Those who successfully pass this utility course are then assigned to one of the aircraft carriers—U. S. S. *Lexington* or the U. S. S. *Saratoga*—for a period of six months' training at sea. At the expiration of six months, the candidates selected by the commanding officer who are considered worthy of further training are sent to the Naval Air Station, Pensacola, Florida, for flight training. Those who successfully complete the flight training course are designated Naval Aviation Pilots.

It must be understood that, in view of the high mental and physical qualifications required for Naval Aviation Pilots, the percentage of successful pilots is correspondingly low.

SAFETY—

Plus
FIGHTING PERFORMANCE!

DURING 1928, in the United States Naval Air Service, Vought planes were flown over 3,500,000 miles—twice the distance flown by any other navy planes, and Vought "Corsairs" are now standard naval equipment.

The Marines in Nicaragua used the "Corsairs" so effectively that the high performance and safety of these fighting planes were proven beyond question.

In Mexico, the Federals are flying "Corsairs"—and the rebels are running.

The Cuban Air Service has ordered a number of these record-breaking planes.

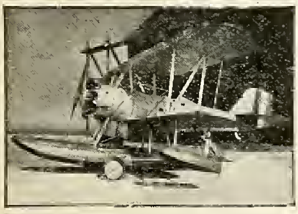
And the Argentine Navy, too!

Why? Because the highest possible safety features are incorporated in the design and construction of the "Corsair." It is easily and quickly convertible from land plane to seaplane or amphibian, and it has shown an all-around performance which has established a new standard of universal service.

Commercially, "Corsairs" are unsurpassed. Their rigid military characteristics provide every assurance of speed—safety—durability—and ease of handling.

The Vought "Corsair" equipped with the new Vought Amphibian Gear.

By use of this new gear, this famous plane has extended still further its already wide range of utility.



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DIVISION OF THE UNITED AIRCRAFT & TRANSPORT CORP.

Aéroplanes VOUGHT

LONG ISLAND CITY **NEW YORK**

FOREIGN NEWS IN BRIEF

Compiled from reports from AERO DIGEST'S correspondents, the Automotive Division and the Transportation Division, Bureau of Foreign and Domestic Commerce

ENGLAND

By Edmund Hawthorne

London-Paris Night Air Mail

On Tuesday, April 9th, the first airliner on the new Air Union night mail from Paris to London left Le Bourget airport at 1:13 a.m. and arrived at Croydon at 4:08 a.m. The plane was piloted by M. Bajac and carried mails, together with nearly one ton of goods which had been collected in Paris late on the Monday night for delivery in London Tuesday morning.

The 225-mile route between Paris and London was lighted by flashing beacons and a million candlepower floodlight at Croydon. The Paris-London night air mail will now run each week-night. Another night mail service of Handley-Page airliners will shortly be opened between London and Brussels.

The British airline company, Imperial Airways, Ltd., celebrated its fifth birthday on April 1st, 1929. Since April, 1924, it has completed on multi-motored airliners over 4,000,000 miles on the London-Continental routes, and has carried more than 100,000 passengers.

There has been no accident resulting in injury to any fare-paying passenger during the past four years.

London to India Air Route

The new air mail service between London and India started on March 30. The distance flown is 5,000 miles, and at present only mail is carried. The speeds of the air service and the ordinary mail route are compared below:

From London to	By air Days	By ordinary route Days
Alexandria	4	6-8
Gaza	4½	7-9
Baghdad	5½	(via Bombay) 23
Basra	6	(via Bombay) 22
Karachi	7½	16

From London to Basle the machines used are trimotored "Argosy" landplanes, thence mails will travel by night express to Genoa. From Genoa to Alexandria the service is by trimotored "Calcutta" metal flying boats, and from Alexandria to Karachi, India, by trimotored "Hercules" landplanes.

On April 4th last, the Prince of Wales made an unexpected visit to Craigweil House by airplane and spent four and a half hours with the King and Queen. The plane used was the Westland "Wapiti" two-place machine, the pilot, as on all previous journeys, was Flight Lieutenant Don.

The French Air Transport Company, which runs a Mediterranean service to the French North African Colonies, has placed an order with Messrs. Short Brothers for one of their "Calcutta" flying boats for this route.

National Flying Services, Ltd., has been organized in England in connection with a plan for stimulating interest in civil aviation, in which the government is to assist by yearly grants to a maximum of £97,500, spread over 10 years. The company is organized for a capital of £500,000.

The plan involves organization of civil flying clubs as well as regular freight and passenger air services. It is planned to put into operation a fleet of 100 airplanes for instruction, private hire and commercial work, and to maintain a staff of 50 flying instructors. A net work of 23 national airports is to be established with a central airport in London.

The Imperial Airways, Ltd., recently announced that a merger of interests between that company and Cobham-Blackburn Air Lines has been arranged for the operation of air service in Africa.

It is understood that the merger foreshadows the early opening of a great 8,000 mile route from London to Cape Town, being connected at Cairo with the London-to-India route which the Imperial Airways is to inaugurate.

MEXICO

Four Waco 220 tapered-wing airplanes, powered with 220 horsepower Wright Whirlwind engines, left the field of the Advance Aircraft Company at Troy, Ohio, recently for an unknown destination on the Mexican border where they were delivered to representatives of the Mexican government for use against the rebels in the revolution in that country. The planes were piloted by J. H. DeCelles, Sherman Willard, Parker Cramer and Major Frederick Lord.

GERMANY

News from Germany

By Dr. Carl Hanns Pollog

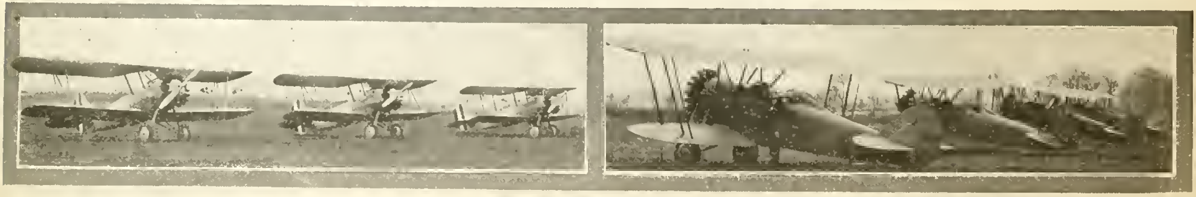
On April 2nd the German glider pilot Nehring started with his motorless plane from the slope of a hill near Darmstadt at a height of about 990 feet above the sea. With a favorable up-current he gained height very rapidly and soon was over the summit of the Melibocus (1,700 feet). From here he proceeded southward along the Western slope of the hills (Bergstrasse), over the university town of Heidelberg, and alighted 1 hour 40 minutes later near Bruchsal. The total distance covered was 44.1 miles, and the maximum height attained 2,900 feet or 1,910 feet above the level of the starting place.

For the summer term of this year, 18 universities and technical high schools of Germany have announced lectures and practical courses in aviation and allied matters. Not a single one of these institutions is, however, in a position to give students actual flying instruction, and at one only, the Technical High School of Darmstadt, flights in free balloons and airplanes are provided for learning avigation and aerological measurements.

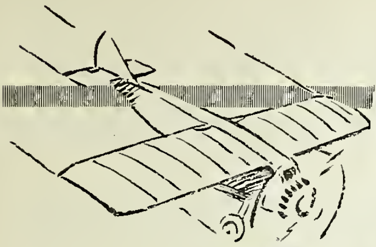
The first German air transport brokerage firm was recently incorporated in Berlin under the name of Deutsche Tramp-Luftfahrt G.m.b.H. The firm intends to inaugurate a kind of tramp air service, not operating, however, its own planes, but acting as agent between shippers and commercial plane owners for the supply of services which would be inconvenient to the regular transport aviation.

Dr. Adolph K. Rohrbach recently returned to Berlin from America, after completing arrangements for the first commercial trans-Atlantic flight to be made in May in a Rohrbach Rostra flying boat. A crew of five and a 2,000 pound cargo will be carried on the trip, which is expected to require three days.

The flight itinerary starts from the Rohrbach company's proving plant at Travemunde, on the Baltic Sea, then to Lisbon, Portugal, where the cargo will be taken on; from there, by way of the Cape Verde Islands, across the southern Atlantic.



Vought Corsairs (left) and Waco 220 tapered-wing biplanes (right) being used in the Mexican revolution.



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The Higher Importance of Fuel and Lubrication

You know and we know that the finer airplane engines of today require better lubrication and fuel than was acceptable a few years ago.

Alive to the higher importance of fuel and lubrication in modern aviation service, the Standard Oil Company (Indiana) has constantly improved Stanolind Aviation Gasoline and Aero Oils in keeping with advance of airplane motor design.

Stanolind Aviation Gasoline and Aero Oils are not merely good. They are as nearly perfect for aviation service as it is scientifically possible to make them. With thousands of flying hours to the credit of these products never has an engine failure been traceable to faulty combustion or imperfect lubrication.

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MINNESOTA
Duluth
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Minneapolis

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St. Louis

317

Swiss Air Services

By Dr. Carl Hanns Pollog

IN 1928 there were two important aviation companies in Switzerland maintaining a regular air mail, express and passenger service and acting under contract with, and with subsidies paid by the Federal Government of Zurich. These were the Ad Astra Aero and the Basler Luftverkehrsgesellschaft (Balair), of Basle. The Ad Astra Aero operated over four and the Balair over five routes, but since one route was flown by both companies under a pooling agreement, there is a total of eight Swiss airlines with a route mileage of 2,104. Only three of these routes were confined to Swiss territory, one connecting Switzerland with Belgium and Holland, three with Germany and one with Germany and Austria. These routes were flown in coöperation with the German and Dutch monopoly aviation companies, the Deutsche Luft-Hansa and the Koninklijke Luchtvaart Maatschappij, respectively.

Statistics of the Swiss Air Services in 1928

Scheduled flights, regular service	4,744
Completed flights, regular service	4,617
Per cent of scheduled flights completed	97.1
Special flights	87
Mileage flown	537,515
Passengers carried	9,688
Weight of mail carried	147,392 pounds
Weight of freight and express carried	363,643 pounds
Weight of baggage carried	55,856 pounds
Total pay load carried	2,275,560 pounds

One or two other companies make taxi and scenic flights, for which Switzerland with its manifold natural beauties is an ideal country. Because of this the Ad Astra Aero commenced scenic flights in 1928.

The figures of the table given above are the results of the summer season (April 23rd—October 13th) only, there having been no aviation activity during the winter last year.

Besides the services flown totally or partly by Swiss companies, six routes were operated into Switzerland by foreign companies without connection with the Swiss lines. Three of these belonged to the Deutsche Luft-Hansa, one to the Imperial Airways limited of London, one to the Air Union, of Paris, and one to the Oelag, of Vienna.

SPAIN TO BRAZIL

CAPTAINS IGNACIO JIMENEZ and Francisco Iglesias, Spanish pilots, landed at Bahia, Brazil, on March 26, completing a 4,000-mile non-stop flight from Seville, Spain, in 43 hours 48 minutes. They averaged 90 miles an hour on the trip and landed 800 miles from their goal, Rio Janeiro.

Jimenez and Iglesias flew in the *Jesus del Gran Poder*, a Breguet biplane, powered with a 600-horsepower Hispano-Suiza engine. To keep the engine water warm a radiator was installed which the pilot could retract into the round fuselage.

This is the sixth successful flight across the South Atlantic Ocean.

CANADIAN AIR NEWS

BY JAMES MONTAGNES

AN international goodwill flight was made by twenty-nine members of the Toronto Flying Club in a dozen planes to Detroit during the All-American Air Show. The fliers were the guests of the officers of Selfridge Field while in Detroit, the visit being a return visit following the flight to Toronto last fall of officers of Selfridge Field.

THE Ottawa Flying Club was successful is obtaining a grant of $1,000 from the city of Ottawa. The club intends to use the money for improvements of its field, which needs concrete runways.

FOUR officers of the Royal Air Force, England, to be stationed in Canada on exchange, arrived at the Department of National Defence at Ottawa during the first week of April. While these officers arrived in Canada, a similar number went to England, increasing the total of Canadian flying officers in training in England to twelve.

THE formation of an association of all manufacturers of aircraft, aircraft accessories and commercial operators is being organized in Montreal, according to the Civil Aviation Branch at Ottawa, which is inclined to look upon the move as one of the most important events in the history of Canadian aviation.

The new association, which has not yet been named, will be organized along the lines of the Aeronautical Chamber of Commerce in the United States. It will have for its chief aim the advancement of the industry in Canada.

EIGHT new flying clubs are expected to complete their organization in various cities throughout the country this year, making a total of 24 clubs for the whole of Canada. Sixteen machines are now on order for allotment to these clubs as they complete their organization. These clubs are at Fort William, Ont.; Peterborough, Kingston, St. Catherines and Brantford, in Ontario; Quebec; St. John, N. B.; and the district of Cape Breton, N. B. Among the clubs expected to complete their organization by next year are those at Sherbrooke, Kitchener, Brandon, Kamloops, and Moncton.

THE Canadian Aviation League, a section of the Aviation League of Great Britain, is to hold its annual meeting in Ottawa in May, according to Major General J. H. MacBrien. The League will hold an executive meeting in Winnipeg, where the actual date of the annual meeting will be decided. Major General MacBrien, formerly chief of General Staff for Canada, is president of the League, and also of International Airways, the largest commercial operators in eastern Canada.

RADIO beacons may soon make their initial appearance in Canada. Investigations by Canadian air officials have been carried on the past few weeks in the United States, with the result that the Winnipeg-Calgary route is being contemplated as the first to be concerned.

Western Canada Air News

By C. D. McCabe

THE Curtiss Aeroplane and Motor Co., Garden City, L. I., is to erect an assembling plant in Winnipeg. The first unit of the factory will be commenced right away. It is understood that this will be the main factory and principal distribution center for all of Canada. The location is adjoining an area that is being conserved for one of the finest airports in the west, having an excellent river landing course on two sides of the property.

THE Winnipeg Flying Club is now busy with plans for an aircraft meet and flying exhibition to be held at Stevenson Field, May 24-25.

In the last flying tests for pilots' licenses given by Howard Ingram, Assistant Inspector of Civil Aviation in Western Canada, five club members were successful. This makes a total of 36 pilots who have received their entire training in the club.

THE Royal Canadian Air Force started its first fire patrols shortly after the middle of March. Two planes are stationed at Lac du Bonnet, Coromant Lake, Norway House and Ladder Lake. These ships carry only a pilot and observer and are to spot the early fires, some of which may have been burning all winter under the snow. The regular patrols will be commenced in May and the big planes are being overhauled now for this service.

THE Civil Aviation Department of Canada is taking steps to prepare an air mail service across western Canada this summer. It expects to call for tenders to supply about fifty airway beacons, spacing these about 30 miles apart on the route between Winnipeg, Regina and Calgary. Land will be leased for the beacons and if possible they will be situated in fields that could be used for emergency landings.

THE Canadian Minister of Interior is now inaugurating a five-year program of air mapping to cover Northern Alberta in the region north of the Peace River country. This district is so large that the ground survey method cannot keep up with the new settlements and the Department of National Defense will be asked to furnish a number of special photographic machines to cover this area.

Capt. Dickens Wins McKee Trophy

CAPT. C. H. DICKENS, of Edmonton, in the service of the Western Canada Airways, was awarded the McKee Trophy by the Minister of National Defense, as having made the most important flight in Canada in 1928. This trophy is the gift of the late J. Davell McKee, a Pittsburgh man interested in Canadian aviation.

The basis for this award was a flight made last summer in a Fokker Super-Universal, on a mining survey. The total distance covered was approximately 4,000 miles in twelve days, or thirty-seven flying hours. Had this trip been made by ordinary means it would have taken over eighteen months.

How swift the tempo of the saga of the air

Winged transport ships fly the air lanes of today with the regularity of ocean liners. Truly aviation is a business!

IT is a splendid thing for aviation that wonders of yesterday have become the habit of today. Bright conquests of other years never lose the sharp edge of their memorability, even if exceeded in figure and in fact. That is the history of all pioneering and the bravest and most modest are the first to realize it.

Of all the companies in aviation Wright, perhaps, has the best title to boast the sum of its attainment. For Wright engines have made history too often to repeat, too gloriously to forget.

But Wright's face is towards the future . . . as should be the faces of all. For what Wright has already accomplished is little to what the industry will do.

For aviation is a business. We know it. You know it. And the public is grasping it fast. For men will take their ways upon the air as now they take a taxi . . . men will sleep among the clouds as tonight they ride the Pullmans. And people who are asking themselves about a two-car garage will sometime worry about a hangar.

This is a business. Our common interest is to develop it systematically and in a business-like manner.

• • •

A striking series of new Wright descriptive booklets and bulletins is now ready for distribution. You are invited to write for them. Please order by name: GENERAL CATALOGUE, WHIRLWIND ENGINES (*J-6 Series*), CYCLONE BULLETIN, THE STORY OF WRIGHT AERO, OFF THE GROUND AND GO. *Also:* WHIRLWIND-NINE, WHIRLWIND-SEVEN, WHIRLWIND-FIVE, *and* WRIGHT-GIPSY.

WRIGHT
AERONAUTICAL CORPORATION
PATERSON, NEW JERSEY

WRIGHT AERO

TECHNICAL

THE DESIGN OF WELDING JIGS AND FIXTURES

PRODUCTION operations are greatly aided by the use of jigs. Jigs are special fixtures or machines designed to hold the part on which the operator is at work. In the field of welding their use has been advantageously utilized for a long time and many operations which would otherwise take a great deal of time are speeded and facilitated by means of carefully designed and efficient working devices.

The main reason underlying the use of jigs for oxy-acetylene welding and cutting operations is economy. Usefulness of jigs is best shown in standardization of production output of large numbers of similar parts. Jigs simplify processes of assembly and relieve the operator from all extra work which does not come under the head of actual welding. The result is that savings are gained through the regularity and correctness of the welded parts and through economies in speed and cost of manufacture.

Another reason for the increase in use of jigs in welding operations is the fact that many of them can be made in the shop using the oxy-acetylene cutting and welding apparatus. On jigs with angle iron framework, the parts can be cut by means of the oxy-acetylene blowpipe, and can be welded together. Some jigs using large metal sections such as heavy plates to conduct heat away can be cut from rolled stock by means of the oxy-acetylene cutting blowpipe, the members can then be welded together so that they form a sturdy and rigid framework for the welding operations. Angle iron jigs are extensively used for aircraft welding.

Jigs, as used in welding, perform two distinct functions. The first is to hold the pieces firmly in correct position for high quality welding so that warpage or buckling will not occur.

The second, a development of the age of rapid production of similar parts, is the use of a jig for the purpose of completing the work in the quickest possible time.

In designing a jig to fit a special application of welding all the following items should be kept in mind as the basis for the ideal welding jig and as many as possible of these features should be included in its makeup.

An efficient welding jig should:

1. Hold the work pieces positively in position.
2. Be made so that the work can be quickly inserted and removed.
3. Make impossible the insertion of the work piece in any but correct position.
4. Provide devices for rapid and steady clamping and adjusting without undue effort.

Welding a steel tube fuselage

5. Allow no spring in the work piece from clamping operations.
6. Allow no buckling, warpage, or other distortion from expansion or contraction due to the heat of the blowpipe.
7. Permit inspection of the weld if necessary.
8. Be easily cleaned, and have faces which will hold without marring the work.
9. Be as light as is consistent with the rigidity and strength necessary in such equipment.
10. Be easy to handle and not unwieldy.
11. Be safe under all circumstances.
12. By its construction or location, permit the operator to work without any undue inconvenience or unnecessary fatigue to the blowpipe operator.
13. Be movable, if possible, so that all seams will be made in a horizontal position.

CAMPBELL AUTOMATIC NIBBLING MACHINE

THE Campbell nibbling machine, manufactured by Andrew C. Campbell, Inc., Bridgeport, Conn., is an automatic machine for cutting out the wide variety of small parts and fittings required in airplane production. This machine is simple in operation and consists simply of a circular die above which a cutting punch operates at high speed and cuts metals or composition sheets along an inscribed line or to a template.

According to the producer's claims, the cutting operation does not distort the material being cut and therefore does not start invisible fractures which might result in a complete failure of the part at some later time. These machines are now installed in several airplane manufacturing plants throughout the United States.

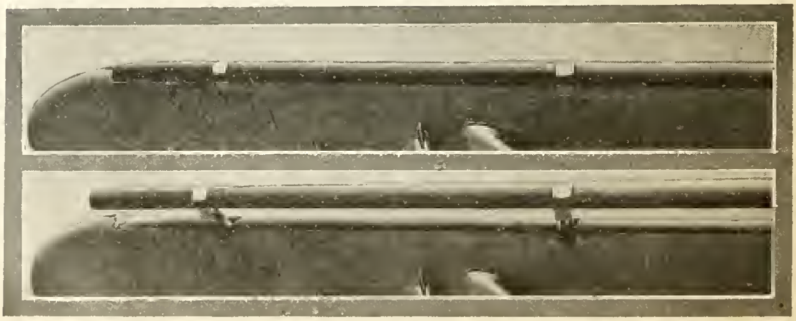
WING SLOTS ON CURTISS SEAHAWK

A NEW method of installing automatic slots on the wings of an airplane has recently been devised by the engineering department of the Curtiss Aeroplane and Motor Company. It was developed in connection with the installation, at the request of the Navy Bureau of Aeronautics, of slots on a Curtiss Seahawk, a high-performance, single seater, shipboard fighter.

Former practice in the installation of slots has been to attach the auxiliary foil to the wing by means of links pivoting on supports located underneath the wing in the airstream. On the Seahawk, on the contrary, the slot mechanism is housed entirely within the wing, the auxiliary foil being attached by means of four steel tubes, which slide in and out of the leading edge between rollers held in metal frames bolted to the forward wing spar. A locking device can be rendered inoperative to prevent interference with maneuverability.

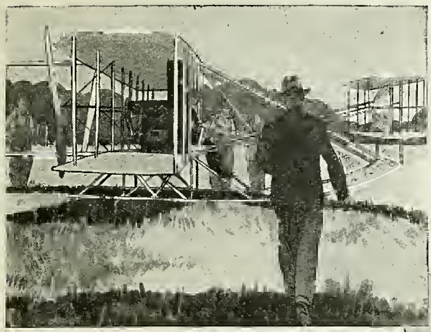
It is areodynamically cleaner, since the operating mechanism is entirely internal. It is also said to be more efficient, since it places the auxiliary foil in a better position with relation to the wing than does the linkage mechanism.

Actual operation of the slots in flight tests at Mitchel Field, Long Island, N. Y., was found to be very satisfactory. Landing speed was much reduced, positive lateral control provided at the stalling point, and spinning effectively prevented.

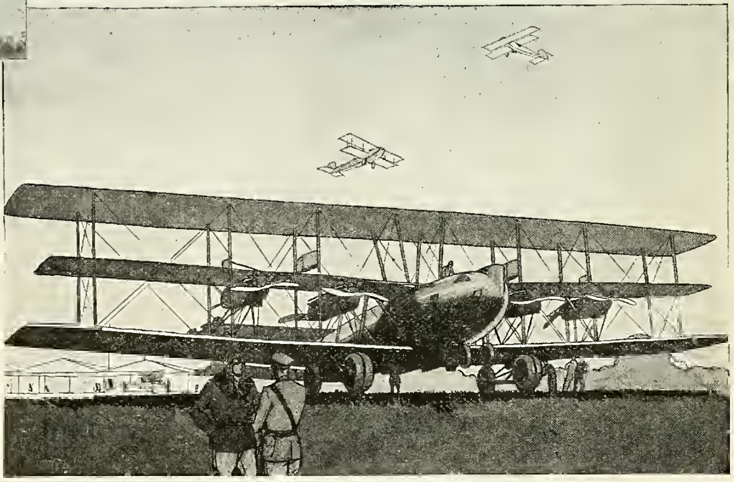

Automatic slots on the Curtiss Seahawk in open and closed positions

Nearly a Quarter of a Century ago . . . and now!

The United States Government Always a Goodrich Customer



By way of contrast compare the modern airplane on the right with this old "crate."



The world's largest airplane tires were made for this giant bomber . . . by Goodrich

WHEN Goodrich first made aviation tires the United States Government was one of its *first* customers. And customer our Government has remained from the days of the first fabric clincher tires until this modern day of stream-line giants.

Recently Goodrich made the world's largest airplane tires for the U. S. Army's Barling Bomber. Tall as many flyers, these great rubber-and-fabric hoops measure five feet, four inches in height. A score of tail wheels could be hidden safely inside their cross sectional diameter.

Smaller sizes of this same type have long been used on planes of the War Department Air Corps, the United States Navy and on the vast majority of commercial airplanes. For it is a well established fact among both civilian and military authorities that there are no "second best" Goodrich airplane tires.

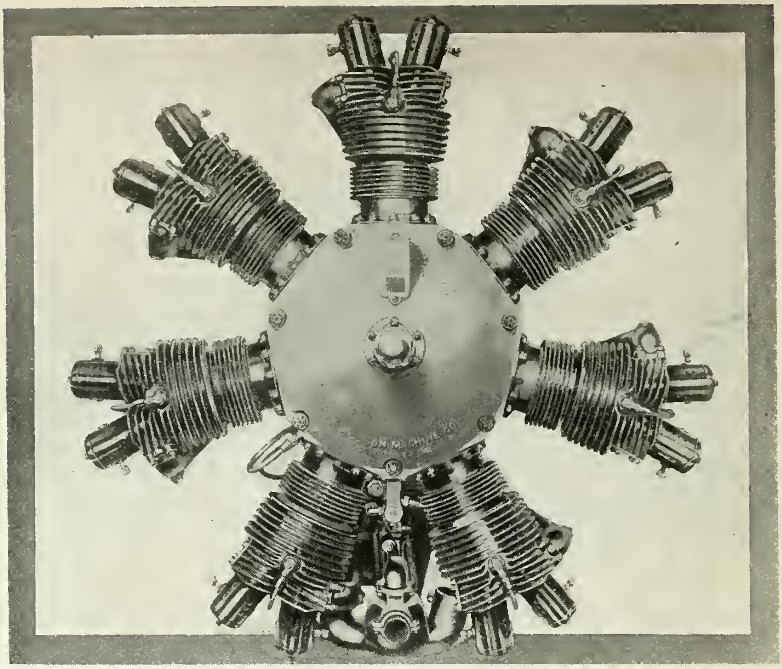
The B. F. Goodrich Rubber Company *will not* endanger life by manufacturing anything less than the *best* aviation tires that science and skill—*Goodrich* science and skill—can construct.

THE B. F. GOODRICH RUBBER COMPANY, Akron, Ohio. Established 1870. Pacific Goodrich Rubber Company, Los Angeles, Calif. In Canada: Canadian Goodrich Company, Kitchener, Ont.

GOODRICH has staked out its field in aviation. The realm of heavier-than-air-craft is its zone of endeavor. There Goodrich has pioneered . . . there Goodrich has helped to write history. And there Goodrich still leads with products as far advanced as the modern flying field is advanced over the fair ground landing lots of twenty years ago.

Goodrich ***Rubber for Airplanes***

AXELSON
SEVEN CYLINDER
150 h.p. ENGINE



Propeller end of the 150 horsepower Axelson engine.

ONE of the types of engines at present manufactured by the Axelson Machine Company is a 7-cylinder radial design with a rated capacity of 150 horsepower. This engine was recently approved by the Department of Commerce in Washington and was accorded certificate No. 16. The torque stand tests show a horsepower of from 144 to 146. One of the features of the engine is said to be its unusually small oil consumption.

Aluminum crankcase is comprised of four sections, namely, the front section, center section and two rear sections, forming the main portion. The rear section carries the accessories and accommodates the carburetor.

The crankcase is constructed of special alloy aluminum which is poured in the Axelson foundry.

The three main crankcase sections are held together with seven through bolts, forming a rigid unit not subject to distortion and free from internal strains. Six of these through bolts also extend to the rear for mounting the motor directly upon the ship.

Crankshaft is composed of two sections which are joined by a fitted tapered joint keyed together and securely locked with a nut. This permits of the use of a solid one-piece spool bearing to which the connecting rods are pivoted. Special babbitt-lined bronze bearings for the crankshaft are used. These bearings are of ample proportion. The thrust is absorbed by a ball thrust bearing.

Connecting rods are steel drop forgings accurately machined. The Axelson metallurgical and research laboratories have contributed refinements in the composition of the metal and in the heat treatment of the connecting rods.

High test pistons are die cast from special aluminum alloy. They are ground and precision-gauged to an exact finish, and are sensitively balanced. Each piston is equipped with five rings, four for compression and one oil ring.

Cylinder assembly is of symmetrical design, the head being made of cast aluminum alloy with integral cooling fins, scientifically spaced and proportioned to obtain the greatest degree of cooling area. The cylinder is bolted to the crankcase by studs which are wired as an added safety precaution to prevent any possibility of working loose.

The cylinder is machined and ground from a forging of heat-treated chrome nickel steel. The head is permanently attached to the cylinder proper, being screwed and shrunk on.

Valve seats are of special bronze, being cast into position in the cylinder head and securely retained in their anchored position by means of a locking device.

Fins on the steel cylinders are of aluminum, pressed into position previous to shrinking on the head.

Compensating rocker box embodies a pivot rocker-stud, capable of compensating any change of lengths of push rods and automatically equalizing the valve lifts at all times. The rocker arm contacting with the valve stem and push rod is of the roller type which reduces friction to the very minimum.

Alloy steel valves are made of high grade metal, selected for its great heat resistance and enduring qualities. The valve guides are pressed and shrunk into the cylinder head, the intake guide being of bronze and the exhaust of high-speed steel. The valve opening in the seats is 1⅞ inches. Valve lift is 7/16 inches and the valve stem diameter ½ inch.

Double track cam for actuating the valve mechanism is machined and ground to a polished working surface. This double track type cam is integral with its drive gear, making it compact in design and eliminating several parts. The cam and all the various accessories are located in the rear of the motor, easily accessible. The cam rotates at only ⅛ crankshaft speed.

Rocker arms operate in enclosed rocker boxes attached to the cylinder heads, so that the expansion due to heat does not affect the setting of the valve clearance. Being completely enclosed with covers tightly sealed, the engine has a clean appearance. Every moving part is completely housed, yet at the same time is easily accessible.

Intake manifolds are brought through the crankcase, where they are rigidly anchored and gracefully curved to the clinder heads. Exhaust manifold is carried from the side of each cylinder head, being readily connected to the annular main exhaust ring.

Standard equipment includes the Stromberg carburetor, Type NA-S5-A. Interposed between the carburetor and the rear crankcase section is the Axelson oil cooler which serves a double purpose. Warm oil is circulated through an annular space adjacent to the main passage for the gas mixture which supplies heat to the vaporized fuel which has the effect of supercharging it by increasing its efficiency of combustion and thus preventing freezing of the throttle. At the same time the oil temperature is reduced.

A heater for the incoming air is located below the carburetor. Two large inlets for air are provided.

Two Scintilla magnetos are furnished as standard equipment, mounted on the rear section. The magnetos turn at ⅞ the crankshaft speed.

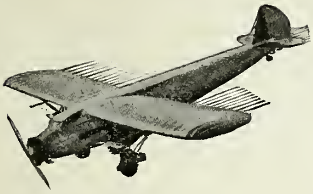
Oil is transmitted from the tank to the pressure pump, which is mounted on the rear of the engine. It is then transmitted to the front main bearing, thence passing through the hollow crankshaft to the rear main bearing, reaching the oil sump which is connected below the crankcase between the fourth and fifth cylinders. Before entering the sump the lubricating oil is passed through a pressure relief valve which is adjustable to maintain proper oil pressure at approximately 65 pounds per square inch.

Provision is made for attaching a thermometer unit to the sump by the scavenging pump which, with the pressure pump, forms a compact unit. Thence the lubricant passes through the oil cooler and is brought back to the oil tank, thus completing the cycle.

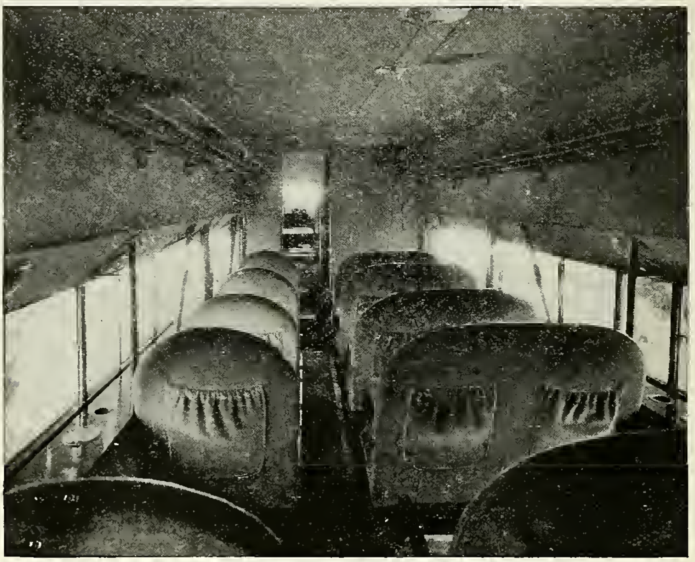
This positive system of lubrication of the main bearings is based on the most approved principle and assures uniform distribution of the oil at all times.

At cruising speed the fuel consumption is

(*Continued on next page*)



7 cents per passenger per mile!



Main Cabin of the Patrician—Private Compartment forward

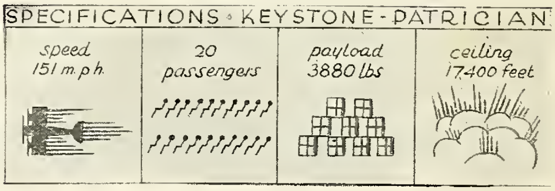
TO ESTABLISHED transport lines, the PATRICIAN affords hitherto unexisting opportunities for increased patronage, with greater economy in operation. The incomparable speed of this transcontinental air liner, its unequalled capacity for passengers and freight, make possible a new low level in operating costs . . . conservatively, 25% to 50% lower than with other transports. This calculation, based on full load, takes into consideration among other charges, insurance, interest, depreciation and hangar rental.

The PATRICIAN has flown many thousands of miles in every section of the United States from the Atlantic to the Pacific, with varying loads and under all conditions encountered in regular transport service. Its magnificent performance is a matter of record, carefully compiled during actual operation, precise, authentic. Vastly improved schedules—entirely new standards of convenient, luxurious travel by air—*increased safety because of its great reserve of power*—are now assured by this newest and greatest air transport.

An analysis of the savings to be effected with the PATRICIAN in individual cases will be prepared upon request.

KEYSTONE AIRCRAFT CORPORATION
Sales Dept.—31st Street and East River, New York
Plants—Bristol, Penna., and New York City
California Representative: W. E. Thomas, 3417 Angeles Mesa Drive, Los Angeles

*The Patrician—
Fastest Transport
in the World*



SPECIFICATIONS • KEYSTONE-PATRICIAN

speed 151 m.p.h.	20 passengers	payload 3880 lbs	ceiling 17400 feet

KEYSTONE

"THE KEYSTONE OF SAFE FLYING"

(*Continued from page* 94)

5 pounds per horsepower per hour. Oil consumption at cruising speed is at the rate of .016 pounds per horsepower per hour.

Other specifications of the Axelson engine are as follows:

Specifications

Rated horsepower at sea level	150
Bore	4.5 inches
Stroke	5.5 inches
Piston displacement	612.15 cubic inches
Compression ratio	5 to 1
Weight (without propeller hub)	450 pounds
Fuel consumption, cruising speed	.5 lbs. h. p. hour
Oil consumption, cruising speed	.016 lbs. h. p. hour
Maximum diameter	45.5 inches
Maximum length	33⅝ inches
Shipping weight, approximate	810 pounds

NEW EQUIPMENT FOR ALTITUDE FLYING

ELECTRICALLY heated goggles and gloves for high altitude flying have been designed by the aerial photographic unit of the material division at Wright Field Dayton, Ohio. The amount of energy required for each of these altitude accessories is less than that used by an ordinary incandescent lamp.

Difficulty has been experienced at high altitudes because ordinary goggles completely frost over at temperatures of 60 to 80 below zero. To prevent this, goggles have been constructed having double glasses for each eyepiece. These glasses are separated nearly an inch, and an electric heater warms the air space between. The energy used to heat the goggles is 24 watts, which is tapped off the 12-volt airplane generator circuit.

Electrically heated gloves were constructed with a new type of resistance. The resistance units are semi-flexible, and are constructed of resistance wire that is not brittle and has four times the tensile strength of copper. Four small units are used in each glove, and are connected in parallel so that the failure of one unit will not affect the operation of the others. A double-throw switch is provided so that the gloves may be in series using 10 watts, or in multiple using 40 watts. An electrical oxygen heater has been designed for warming the oxygen gas just before it passes to the face mask.

ICE FORMATION ON AIRPLANES

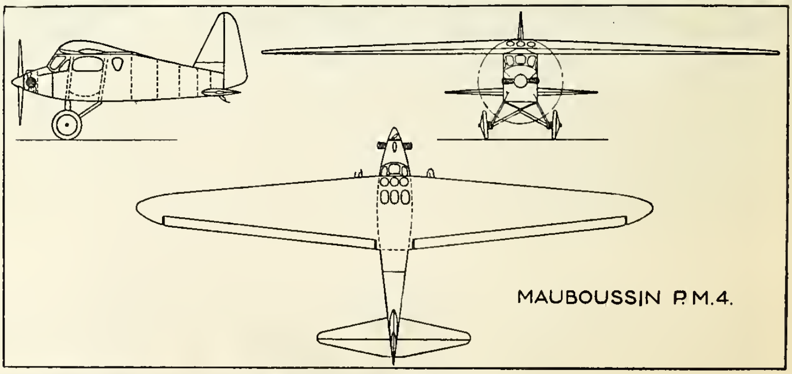
ONE of the greatest difficulties encountered by air mail airplanes is the formation of ice in the carbureter, which necessitates a forced landing, according to Fred P. Laudan, of the Boeing Airplane Co., who spoke recently at a meeting of the Northwest section of the Society of Automotive Engineers in Seattle, Wash. This trouble occurs most often in night flying between Cheyenne, Wyo., and Chicago, particularly around Omaha. Most of the difficulty is caused by moisture in the air at temperatures between 24 and 32 degrees Fahrenheit.

A hot spot heater designed by the Pratt & Whitney engineers to be placed between the carbureter and the engine functioned perfectly, said Mr. Laudan, in a flight made by Pilot Leslie Tower at an altitude of 25,000 feet above Seattle and Mount Rainier, where temperatures as low as 40 degrees below zero were encountered, but it would not work under certain conditions on the mail route between San Francisco and Chicago. So a heater is now used that heats the air before it enters the carbureter, and this has solved the problem for the present.

MAUBOUSSIN AVIONETTE

By Paul E. Lamarche, Jr.

ONE of the first new planes to be constructed in France this year is a light monoplane designed by Pierre Mauboussin and constructed by Louis Peyret. The first test trials were made by Charles Fauvel with extremely satisfying results. With the motor turning up 2,150 revolutions per minute (the normal speed is 2,300 r.p.m.) and with a cross wind, this little plane made a speed of 147 kilometers an hour (about 90 miles per hour). The ceiling for this plane has not yet been determined, but it is hoped that it will easily reach 5,000 meters or about 15,000 feet. In its tests it has reached 2,500 meters, having climbed to the first 3,280 feet in five minutes and twenty-five seconds. The plane is a two-seater cabin plane equipped with a two-cylinder A.B.C. Scorpion motor that develops 32 horsepower.



The 32 h.p. two-seater light monoplane designed by Mauboussin.

The fuselage is comparatively short. The ailerons extend the whole length of the wing, the wing itself being of one piece held to the fuselage by four pins. Gasoline is carried in the wing and oil is carried behind the motor. The wing is of all-wood construction with two main spars and wooden ribs, the whole being covered with plywood. The wing is of the full cantilever type.

The fuselage is of square cross-section, covered with plywood. Good visibility forward is afforded through the windscreen in front of the pilot which slopes up to the leading edge of the wing. Controls are of the conventional stick and rudder bar type. The landing gear is of the split axle type.

(*Continued on next page*)

"Socony is good enough for us"

Donald Woodward Airport at Le Roy, New York, uses Socony in large fleet of planes

"SOCONY is good enough for us here. And our boys have certainly done enough flying to know good gas and oil when they see them. There's Lou Gordon, for instance, co-pilot on the 'Friendship' across the Atlantic."

This is the experience of Russell Holderman, manager of the Donald Woodward Airport at Le Roy, New York—one of the finest private flying fields in the country. The twelve planes in the D. W. fleet, used mainly for commercial flying instruction, are fueled with Socony Aviation Gasoline and lubricated with Socony Aircraft Oil.

You will find this experience duplicated over and over again at airports throughout New York and New England. Try Socony on your next flight, and you'll soon see why these products are so popular.

When flying in the Southwest use the products of Magnolia Petroleum Company, and on the Pacific Coast the products of General Petroleum Corporation. These are two important subsidiaries of the Standard Oil Company of New York.

A group of "D. W." planes ready for action.

SOCONY

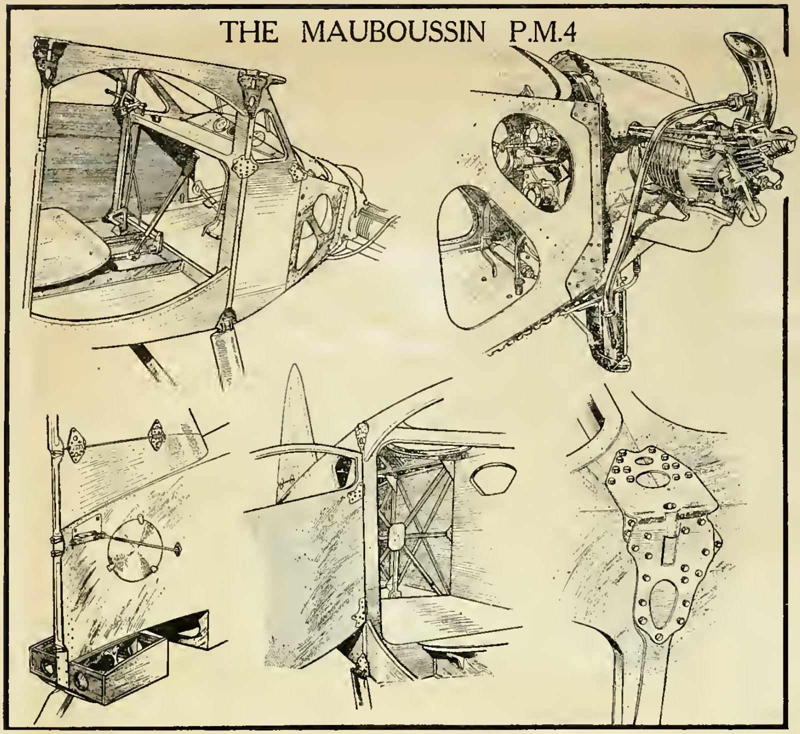
REG. U. S. PAT. OFF.

AVIATION GASOLINE

AIRCRAFT OIL

STANDARD OIL COMPANY OF NEW YORK

THE MAUBOUSSIN P.M.4



Sketches showing some construction details of the Mauboussin monoplane.

(Continued from preceding page)

In the sketches above, at the upper left is shown the structure of the front page of the fuselage with the motor mounting. It shows the cabin control unit and the wing hinges. At the upper right is the installation of the A B C Scorpion 34 horsepower motor with a carburetor air heater. At the lower left is shown the attachment of tail surfaces, rudder horn and a box type attachment of the horizontal stabilizer, which, contrary to the standard practiec, is mounted on the bottom portion of the fuselage. In the center is shown the door leading into the cabin and a rearward view of the fuselage and cabin. At the lower right is shown a wing hinge with a duraluminum strip leading to the landing gear fitting.

The following are the general dimensions and specifications:

Specifications

Span	32 feet 10 inches
Height	6 feet 1 inch
Length	14 feet 5 inches
Wing area	107.6 square feet
Chord (maximum)	4 feet 11 inches
Power	32 horsepower

Weights

Weight empty	40 pounds
Total normal weight	660 pounds
Normal useful load	253 pounds
Power loading	19.4 lbs. per h. p.
Wing loading	6.13 lbs. per sq. ft.

Performance (Calculated)

Maximum speed	96 miles per hour
Ceiling	23,000 feet
Climb to 4,920 feet	7 minutes

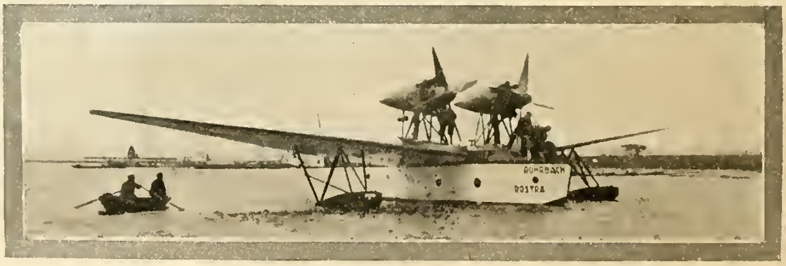
ROHRBACH ROSTRA

By Dr. Carl Hanns Pollog

ONE of the 5 types of planes built since 1926 by the Rohrbach Metall-Flugzeubau G.m.b.h., of Berlin, Germany, has been specially designed as a large capacity freight-carrying flying boat. The type name of this ship is Rostra. Its construction principles are exactly the same as those of the Rohrbach Romar flying boat described in the January issue of AERO DIGEST, page 70. It therefore seems unnecessary to repeat these details here, and it may suffice to give the specifications for this ship below and to add that unlike the Romar, it is powered with two engines only. Gnome-Rhone-Jupiter VI engines are used, giving the plane a power output of from 900 to 1,220 horsepower. Though having been designed as a freight carrier, the Rostra will be supplied to order for passenger transport, too.

Specifications

	Freight	*Passenger*
Span	88 ft. 6 in.	88 ft. 6 in.
Length overall	51 ft. 4 in.	51 ft. 4 in.
Height with propellers running	20 ft. 9 in.	20 ft. 9 in.
Wing area	830 sq. ft.	830 sq. ft.
Weight empty	10,009 lbs.	9,568 lbs.
Weight of instruments, equipment, etc.	1,323 lbs.	1,764 lbs.
Weight of crew (3)	584 lbs.	584 lbs.
Weight of fuel and oil	8,069 lbs.	5,512 lbs.
Pay load	882 lbs.	992 lbs.
Other disposable weight	77 lbs.	99 lbs.
Useful load	10,935 lbs.	8,951 lbs.
Gross weight loaded	20,944 lbs.	18,519 lbs.
Capacity of fuel and oil tanks	1,012 gallons	1,012 gallons
Range (normal fuel)	2,170 miles	1,430 miles
Range (capacity fuel)	2,390 miles	2,420 miles
High speed (fully loaded)	129 m.p.h.	132 m.p.h.
Climb to 3,300 feet	7.3 min.	4.6 min.
Absolute ceiling	9,900 ft.	13,700 ft.



The twin air-cooled tractor engined Rohrbach Rostra flying boat.

THE FEDERAL SKI

THE Federal ski, manufactured by the Federal Aircraft Works, Inc., Minneapolis, Minn., is now available in sizes to fit several well known planes. Skis for larger ships will soon be in production.

The supporting metal column of this ski is of conical construction and has an elliptic base. This construction affords maximum strength with minimum resistance.

The column is placed to the rear of the bearing surface center of the ski, thus giving it a natural tendency to climb when taxying. The load is distributed through the use of ash runners tapering in thickness from the center. The bottom of the ski is sheathed with a metal covering which is additionally reinforced by metal runners.

To insure the proper alignment of the ski both in flight and on the ground, the Federal rigger has been developed. This device is completely enclosed to insure continuous operation and eliminate the necessity of shock cords.

Some of the more notable features of this ski are: its clean aerodynamic design, eliminating resistance and the possibility of accumulating snow and slush and carrying it as dead weight; its metal bottom which is renewable, giving it greater strength, and affording freedom from sticking in wet snow; its tapered construction, giving even load distribution and allowing maximum flexibility when encountering uneven surfaces; and its minimum side area, which insures directional control.

To facilitate the handling of ships in hangars a simple trundling device is available.

The types available at present are as follows: The Midget, gross weight 1,500 pounds, (for Monocoupe, etc.); The Standard, gross weight 2,500 pounds, (for Waco, Eaglerock, etc.); The Special, gross weight 3,200 pounds (for Whirlwind Pitcairn, Laird, etc.); The Commercial, gross weight 4,000 pounds, (for Ryan, Fairchild, Stinson, and other airplanes in this class).

SPARTAN

The New Spartan C-3 Challenger

The early standards of Spartan airplanes have now proven themselves the most effective sales arguments and have resulted in enthusiastic owner satisfaction, expanding and spreading the reputation of Spartan as a builder of advanced aircraft.

Spartans are exact in construction, precise in maneuverability, dependable in performance and built to endure. They are suited to the strenuous demands of commerce, the regular business expedition or the casual pleasure hop. Beauty is obtained by correct design.

The new Spartan C-3 Challenger is rugged but not heavy, and is easily landed with or without power. Qualities of balance and distribution of surface are so thoroughly accurate that flight in the Spartan is natural and does not involve "fighting the stick."

Special equipment which is standard on the Spartan C-3 Challenger includes dual controls, booster magneto, air speed indicator, Oleo gear, 10 by 3 tail wheel with inflated tire, 30 by 5 Bendix wheels and brakes, adjustable stabilizer and Hamilton steel propeller.

An attractive folder giving full details will be sent on request.

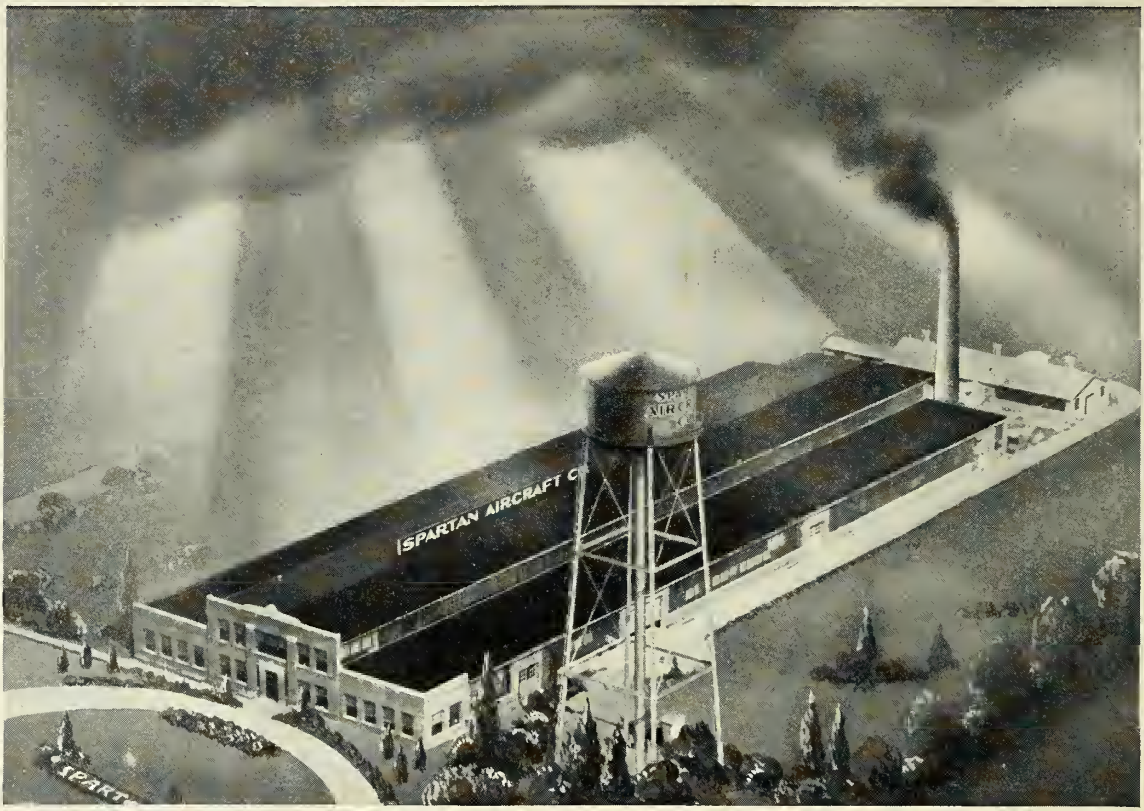
Details and specifications of the Spartan powered by the 130 h. p. Improved Walter Motor will be furnished on request.

The New Spartan C-3 Challenger is powered by the Curtiss-Challenger 170 h. p. radial air-cooled motor.

SPARTAN AIRCRAFT COMPANY

TULSA — OKLAHOMA

DEDICATED TO SAFE AIRCRAFT CONSTRUCTION



AND GEARED TO A STANDARD OF OWNER SATISFACTION

Spartan C-3 Challenger

Spartan C-3 Walter

In the production of aircraft the first requirement is the best that can be had in facilities. These include a factory efficiently laid out and organized, the best mechanical equipment that science can supply, the most highly skilled labor obtainable.

The rest depends upon the attitude of the institution.

In the Spartan organization, there is a sense of conscientious obligation to the Spartan buyer. Exacting standards are maintained; each part is subjected to rigid inspections and tests; each assembled unit is judged by inflexible requirements. The constant aim is for final perfection rather than speed of manufacture.

There has never been a Spartan structural failure.

SPARTAN AIRCRAFT COMPANY

Tulsa, Oklahoma.

CAN THESE LARGE MANUFACTURERS ALL BE WRONG?

Pat. Jan. 3, 1928

KANTLINK spring lock washers—first sold in 1927—are being used by hundreds of progressive, alert manufacturers. A few of the large organizations that carefully tested and are now using Kantlinks are listed below. Such evidence of approval should convince everyone that it would be worth while to order immediately a trial lot for test.

PARTIAL LIST OF KANTLINK USERS

Advance Aircraft Co.
Aircraft Control Corp.
American Bosch Magneto Corporation
F. A. D. Andrea, Inc.
A. C. Spark Plug Company
Advance-Rumley Company
Allis-Chalmers Mfg. Co.
Atwater Kent Mfg. Company
Belknap Hardware & Mfg. Company
Bellanca Aircraft Corp.
Biflex Products Company
Briggs & Stratton Corp.
Edward G. Budd Mfg. Company
Buhl Aircraft Co.
Burroughs Adding Machine Company
Carter Carburetor Corporation
J. I. Case Threshing Machine Co.
Cessna Aircraft Co.
Chance Vought Corp.
Chevrolet Motor Company
Clum Manufacturing Company
Continental Motors Corp.
Crosley Radio Corporation
Curtiss Aeroplane Motor Co.
Cutler-Hammer Mfg. Co. Inc.
Delco Light Company
Delco-Remy Corporation
Dodge Brothers Company
Electric Autolite Company
Elto Outboard Motor Company
Eureka Vacuum Cleaner Company
Fairchild-Caminez Corp.
Fisher Body Corporation
Freed-Eisemann Radio Corporation
Frigidaire Corporation
Gabriel Snubber Company
General Electric Company
General Motors Company of Canada
General Motors Truck Corporation
General Spring Bumper Corp.
Graham-Paige Motors Corporation
Graham Brothers
Grigsby Grunow Company
Harrison Radiator Corporation
Hoover Company, North Canton, Ohio
B. F. Mahoney Aircraft Corp.
Marvel Carburetor Company
G. L. Martin Co.
Maytag Company
McCord Radiator Mfg. Company
Moundsville Airplane Corp.
Nash Motors Company
Oakland Motor Car Company
Pioneer Instrument Co.
Reo Motor Car Company
Shapleigh Hardware Company
Sparks Withington Company
Standard Conveyor Company
Stewart Warner Speedometer Company
Stinson Aircraft Corp.
Stromberg Motor Devices Company
Western Electric Company
Westinghouse Electric & Mfg. Company
Wheeler Schebler Carburetor Company

Plane and engine manufacturers shoud specify Kantlinks. They cost more than the plain coil lock washers, but are well worth the higher price.

Kantlinks do not tangle, do not rust, and have greater holding power.

Write today to any one of the five manufacturers listed below.

Made and sold under license by the Kantlink Manufacturers:

The American Nut & Bolt Fastener Co.
Pittsburgh, Pennsylvania

The Mansfield Lock Washer Co.
Mansfield, Ohio

The National Lock Washer Co.
Newark, New Jersey

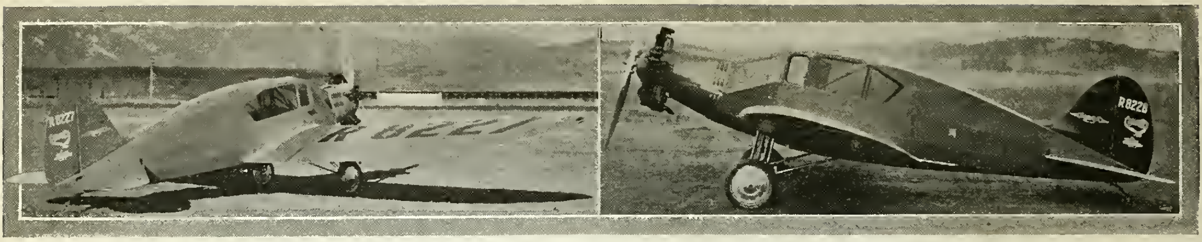
The Positive Lock Washer Co.
Newark, New Jersey

The Reliance Manufacturing Co.
Massillon, Ohio

2999

KANTLINK TRADE MARK **SPRING LOCK WASHERS DO NOT TANGLE DO NOT RUST**

THEY PAY THEIR ENTIRE COST IN TIME SAVED - SOMETIMES EVEN MORE



The Kinner engined Eaglerock Bullet (left) and a side view of the whirlwind powered Eaglerock.

THE EAGLEROCK BULLET

THE Alexander Aircraft Company's new Eaglerock Bullet is a light 4-place cabin monoplane of the low-wing type. It is America's first light landplane equipped with a retractable landing gear.

The Alexander factory at Colorado Springs last month launched quantity production of this low-wing cabin monoplane, while continuing with the manufacture of the Eaglerock biplane on practically the same schedule as last year. The ship is to be powered either with the 100 horsepower Kinner or the Wright J-6 150 horsepower engine.

The new Eaglerock Bullet is the first of a new line of low-wing planes under design in the Alexander factory.

The full cantilever, tapered wings have a span of 38 feet 8 inches, and a length overall of 21 feet 4 inches. Equipped with the 5-cylinder, 100 horsepower Kinner motor, the weight empty is approximately 1,150 pounds.

Most of the important stresses are borne by the full-cantilever wing itself; parasitic resistance is reduced to a low point; and the landing gear retracts completely in flight.

The weight of pilot, passengers, gasoline, baggage and landing gear rests directly on the wing, and therefore produces no stresses in the fuselage structure. This feature enabled the engineers to eliminate much unnecessary weight from the fuselage. The latter simply carries the motor, tail surfaces, its own weight and serves as a canopy for the passengers.

The designer of the Bullet, A. W. Mooney, chief engineer of the Alexander Aircraft Company, and L. H. Height, an assistant, derived mathematically an original wing section for the full-cantilever wings, known as the M-H series of airfoils, and developed a new method of internal bracing which affords great strength and lightness. Information on both features is being withheld pending applications for patents. The refined wing design embodies high lift qualities with high speed and a low drag factor.

The Bullet was the first airplane with a 100 horsepower engine to fly over Pikes Peak (February 22), when Lee Brusse, chief pilot of the Kinner company, Glendale, Calif., flew two Kinner and Alexander engineers over the summit at an altitude of 16,500 feet. Carrying a disposable load of 750 pounds, Brusse hopped off from the Alexander airport and within 40 minutes was 2,000 feet over the peak summit, 15 miles away.

An altitude between 18,000 and 19,000 feet above sea level was reached in the Bullet on March 10 when flown over Pikes Peak by O. R. Haueter, assistant sales manager of the Alexander Aircraft Company and W. A. Williams, sales promoter.

Carrying four passengers, the Bullet has consistently reached a top speed of 130 miles per hour behind a 100 horsepower Kinner.

A hand wheel on the front beam is used to draw up the landing gear into specially designed compartments, completely streamlining the underside of the fuselage. A double safety lock keeps the landing gear in its intended position. It is impossible to release this lock unintentionally. The landing gear drops into landing position and is locked by the release of the trigger. In case of freezing weather, the landing gear can be cranked down mechanically by means of a hand wheel.

Navigation lights are streamlined into the wing tips. The fuselage itself is cambered like an air foil to contribute lift.

There are no heavy structural members above passengers and pilot. With the wings near the ground, the plane's lower center of gravity minimizes the possibility of a nose-over.

Heavy diagonal bracing in the fuselage, which protects the structure from abnormal strains in a one-wheel landing, is cared for in the steel center section, to which the landing gear is attached. This eliminates heavy steel members in the fuselage and makes the plane correspondingly lighter for the same weight carrying capacity and strength.

All controls are operated by push-pull tubes. There are no wires. There are no turnbuckles in the ship, nor any control horns exposed. Zipper inspection windows are placed at strategic points to facilitate inspection of critical parts in the control system.

Because the wing beams are used partly as a seat, the cabin is unusually large for an airplane of this size. The cabin is approximately 110 inches long, 38 inches wide, and 48 inches deep. Ample headroom gives a general impression of roomy comfort.

The two front seats, placed side by side, are adjustable for different leg lengths and may be staggered if desired. Two seats similar in arrangement are placed on the rear beam. One of the rear seats folds up to the wall in such a manner as to allow easy access from the door to the pilots' seats. Dual stick control is provided in front. Either stick may be quickly removed when solo control is desired.

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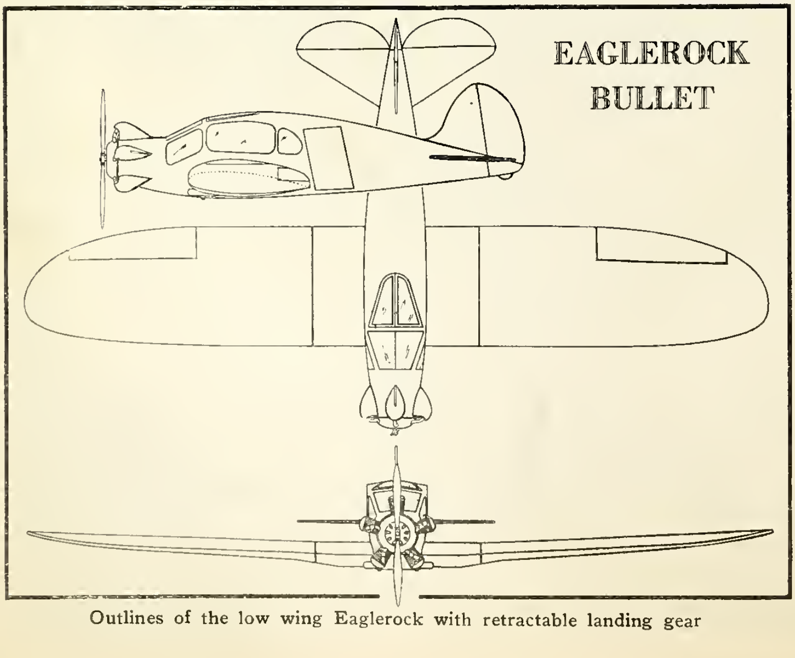


Outlines of the low wing Eaglerock with retractable landing gear

The Walter
AIRCRAFT ENGINES

Holder of 5 World's Records. Permanent Winner of the Coppa d'Italia.

Winner, 1st and 2nd places, in the International Airplane Competition at Orly, France.

"70"

Rated 70 h.p. at 1600 r.p.m., 5-cylinder radial air-cooled, with a bore of 4.1 inches and a stroke of 4.7 inches. Its displacement is 317 cubic inches and its weight 225 pounds.

"90"

Rated 90 h.p. at 1600 r.p.m., 7-cylinder radial air-cooled, with a bore of 4.1 inches and a stroke of 4.7 inches. Its displacement is 444 cubic inches and its weight 280 pounds.

"130"

Rated 130 h.p. at 1600 r.p.m., 9-cylinder radial air-cooled, with a bore of 4.1 inches and a stroke of 4.7 inches. Its displacement is 572 cubic inches and its weight 350 pounds.

90% interchangeability of parts on models "70", "90" and "130". All models include as standard equipment, dual Scintilla Magnetos and S.A.E. connections. These models are available for immediate delivery. A complete stock of spare parts is available for delivery at short notice. An experienced staff of mechanics is ready to render adequate service at all times.

J. WALTER & COMPANY

PRAGUE
CZECHOSLOVAKIA

Willis C. Brown, Tulsa, Oklahoma
GENERAL AMERICAN REPRESENTATIVE

Walter aircraft engines are in daily use all over the world. 35 well-known aircraft manufacturers now install Walter Engines as standard equipment.

(Continued from preceding page)

The fuselage is constructed of welded steel tubing. The engine mount, cantilever tail surfaces and center wing panel are built of alloy steel tubing. The landing gear is of light-weight design and is equipped with oleo rubber shock absorbers and 24 inch by 4 inch tires.

Although weighing less than a pound, one of the main wing ribs has successfully supported over 770 pounds of sand for a period of 20 hours and has supported 1,100 pounds. The strength-weight ratio is over 1,300.

The outer wing panels and ailerons are of wood construction, fabric covered. Two fuel tanks holding 40 gallons are joined in the center wing panel.

The ailerons are inset slightly from the wing tip and are differentially controlled. The stabilizer is of full cantilever design and is adjustable in the air sufficiently to allow for all normal conditions of loading. The fin is adjustable on the ground. Rudder control in a stall or in taxiing is improved by slanting the hinge axis forward, so that the rudder presents its maximum surface to the air flow with the ship at a high angle of attack.

The entire forward part of the cabin is provided with shatterproof windows. The windshield slopes from a point sufficiently high that the pilot has good forward visibility both in level flight and in landing. He also has excellent visibility downward, sideways and upward.

Directly over the pilot's head is a large window which makes possible easy parachute exit in an emergency. This window will fly open when the catch is released by the simple expedient of thumping the top of the cabin.

The baggage compartments are placed on each side of the fuselage between the wing spars. There is ample space on either side for a suitcase, motor cover, tie down ropes and other miscellaneous luggage. This arrangement of seating and storage eliminates the danger of piloting too heavy a load in a baggage compartment placed far to the rear.

The cabin interior is handsomely upholstered. A light grey headlining is used with darker grey below. Each seat is overstuffed and there is a soft carpet on the floor.

The plane is entered through a large door on the left side, behind the wing. It is slanted forward so that it is upright when the tail wheel is on the ground.

The Bullet is to be equipped with tail wheels and brakes.

Specifications

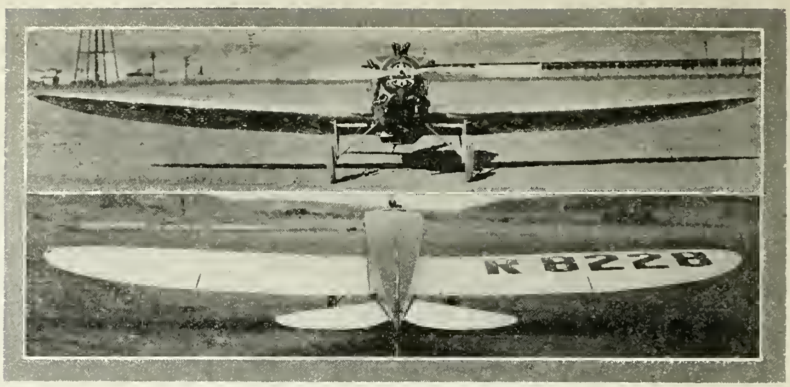
Wing span	38 feet 7 inches
Wing area	202 square feet
Height overall	8 feet 3 inches
Pay load	670 pounds
Disposable load	1,100 pound
Fuel capacity	40 gallons

With Kinner Engine

Length overall	21 feet 7 inches
Weight empty	1,150 pounds
Normal gross weight	2,250 pounds
High Speed	130 miles per hour
Cruising speed	111 miles per hour
Landing speed	42 miles per hour
Climb, sea level	640 feet per minute
Service ceiling	11,000 feet
Normal range	683 miles
Fuel consumption	6.5 gallons per hour

With Wright Engine

Length overall	21 feet 1 inch
Weight empty	1,300 pounds
Normal gross weight	2,400 pounds
High speed	150 miles per hour
Cruising speed	127 miles per hour
Landing speed	45 miles per hour
Climb, sea level	838 feet per minute
Service ceiling	15,000 feet
Normal range	612 miles
Fuel consumption	8.3 gallons per hour



Front and rear views of the new Eaglerock Bullet monoplane.

THE CARDINAL MONOPLANE

THE Cardinal, a new cabin monoplane manufactured by the St. Louis Aircraft Corporation, a subsidiary of the St. Louis Car Co., St. Louis, Mo., was displayed at the Detroit Aircraft Show.

Fuselage is of chrome molybdenum and 10-25 carbon steel. Wing is of spruce spars, beam construction, covered, as is the fuselage, with linen. Two aluminum gasoline tanks, each having a capacity of twelve and one-half gallons, are built in the wing, the intakes being conveniently located for refueling. The oil capacity is three gallons.

Tail skid assembly is of micarta wheel design. Split axle type landing gear is of spring pneumatic construction. Internal expanding brakes are standard equipment.

The ship is powered with a five-cylinder air-cooled LeBlond engine of 65 horsepower. The wing is wired for navigation lights and tubed for air speed indicator. The stabilizer, which may be adjusted in flight, has a range of from two degrees positive to one degree negative. Hartzell propellers are standard equipment.

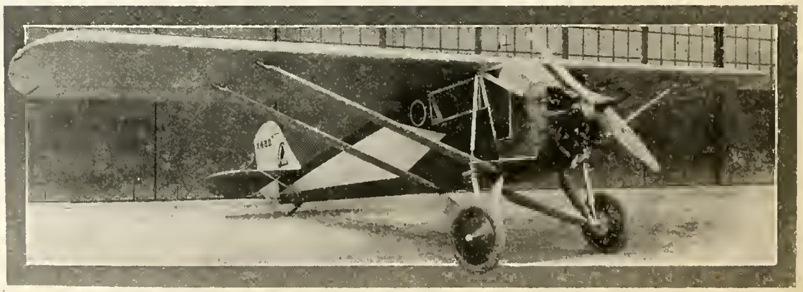
The Cardinal is designed to accommodate two persons. The cabin has an automobile type seat, well upholstered. Entrance to the cabin is through a wide door. Windows of Charmoid, a non-inflammable synthetic glass, provide good vision. Upward visibility is possible through a skylight.

For instruction, the ship is provided with two sets of rudder pedals and a special attachment on the stick by which the ship may be flown from either seat.

The color scheme is a combination of cardinal red and silver.

Specifications

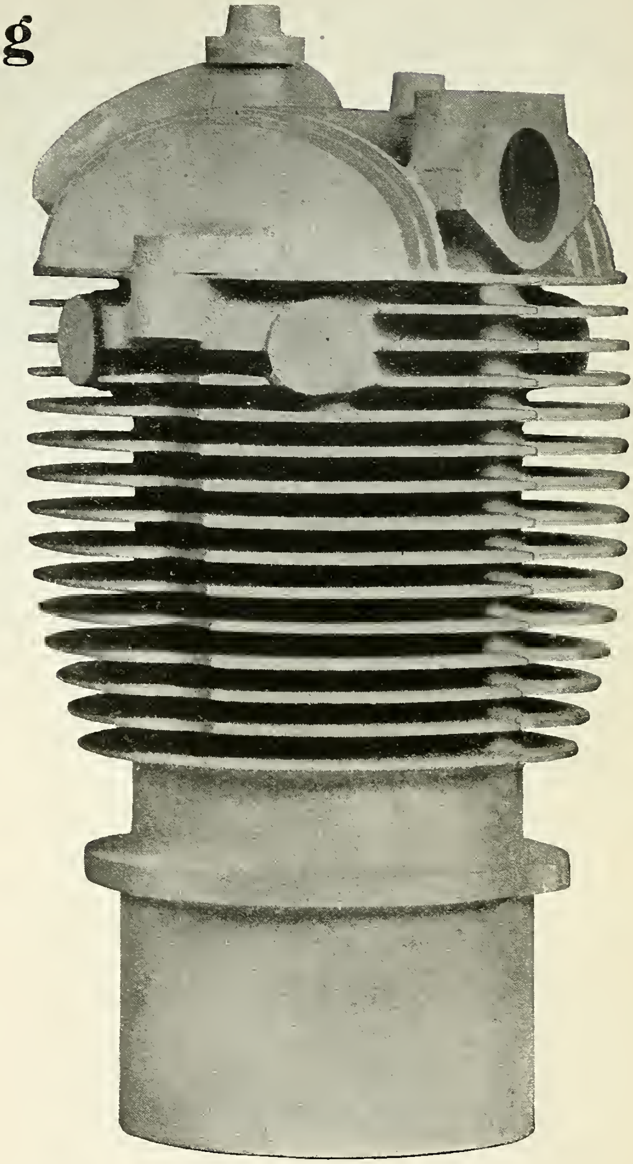
Span	32 feet 4 inches
Length overall	20 feet 7 inches
Height overall	7 feet
Chord	5 feet
Area of wing	162 square feet
Weight empty	825 pounds
Gross weight (loaded)	1425 pounds
Disposal load	600 pounds
High speed	105 miles per hour
Cruising speed	85-90 miles per hour
Landing speed	35 miles per hour
Fuel capacity	25 gallons
Cruising range	500 miles



The Cardinal, a new cabin monoplane manufactured in St. Louis

Improved Wearing Qualities

In Cheney-Cast Cylinders

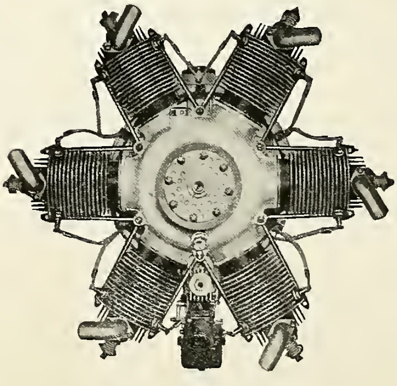


In the long and thorough research work preceding the development of the remarkable nickel-iron used in Cheney-Cast Cylinders, the prime importance of wear-resisting characteristics was continually emphasized.

The resulting iron, with a uniform distribution of carbon, has exceptional wearing qualities as well as high strength-characteristics.

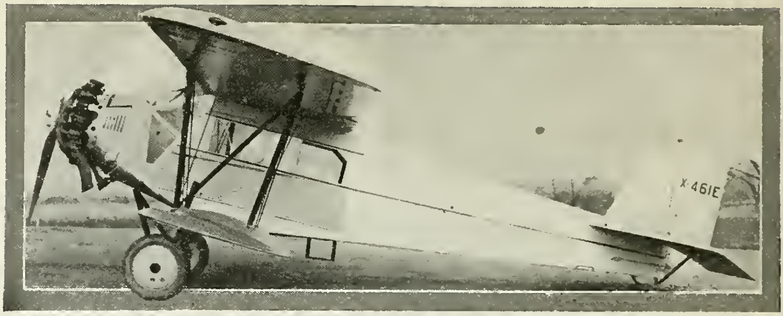
If you have been thinking of cast cylinders in terms of ordinary gray iron castings, it will pay you to investigate Cheney-Cast Cylinders. They are the result of twenty-five years' experience in making air-cooled cylinders.

S. Cheney and Son
MANLIUS, N.Y.



Brownback Model C-400 Motor. Equipped with Cheney-Cast Cylinders

CUNNINGHAM-HALL BIPLANE



The 300-h.p. Whirlwind-engined Cunningham-Hall biplane

THE six-place cabin biplane of all-metal structure produced by the Cunningham-Hall Aircraft Corporation of Rochester, New York, reflects the trend to the more extensive use of metal in airplane structures. This ship has the conventional steel tubing fuselage of welded construction, but differs from the usual type in that the forward part of the fuselage is covered with corrugated sheet duralumin.

Fuselage primary members are chrome-molybdenum steel tubes. To facilitate production the longerons are locally squared at the joints by means of special dies, thereby avoiding the usual curved bevel joints of the abutting members. The cabin is reinforced by .016 inch thick corrugated duralumin sheet, heat-treated. This corrugated sheathing adds considerable strength and provides an excellent wall for insulation and sound proofing purposes, but it is not a requisite of strength. The material used in the walls for insulation against temperature and noise is Balsam-wool.

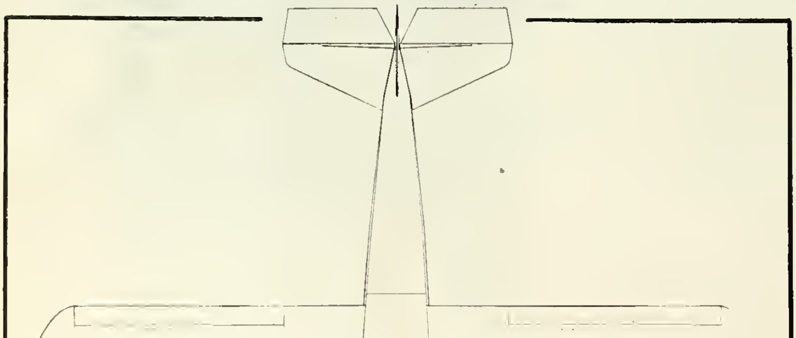
The main cabin accommodates four people. The cabin is exceptionally roomy, and there is complete absence of the feeling of restricted or cramped interior. The passengers may stand erect or change seats in flight with perfect ease. The chairs are comfortably upholstered and are of sufficient height and proportion to insure natural posture of passengers. The main cabin is trimmed in real leather matching the upholstery of the chairs. Large windows afford passengers good visibility.

The forward compartment accommodates the pilot and one other person. This compartment is separate from the main cabin to which access is had by means of an intercommunicating door. On either side of the pilot's compartment is a door for entry and exit without going through the main cabin. The pilot's seat is adjustable enabling the pilot to suit the seat position or to quickly change his position while in flight. The second seat in the forward compartment is folding and drops down below the floor when not in use. The arrangement of windows, of generous size, and the windows in the panels of the two doors afford the pilot exceptional vision. The seats in the forward compartment are made of sheet and tube duralumin, and are equipped with seat and back cushions. Stick control is standard equipment. A dual set of controls, easily installed or removed, is provided for use of a relief pilot or for instruction purposes. The instrument board is equipped with a complete set of flying and engine instruments, and is lighted by two sets of lights, one indirect and the other direct.

A large baggage compartment is located in the fuselage to the rear of the main cabin.

An unusual feature of the design is the all-metal wing structure. Wing ribs are Warren truss type of heat-treated ⅜ inch o. d., .028 inch wall duralumin tube, in which a special riveted joint is employed. The ribs of this type are exceptionally strong, sustaining over 1,100 pounds in static tests.

Upper wing beams are of the truss type, consisting of upper and lower longitudinals of 1½ inch o. d., .049 inch wall chrome molybdenum steel tubes, heat-treated to over 125,000 pounds per square inch tensile strength. The upper longitudinals are reinforced for a considerable distance at the outer support by 1⅝ inch o. d., .058 inch wall chrome molybdenum steel tubes, likewise heat-treated. The main longitudinal members of the wing beam are spaced by double vertical and diagonal members. The vertical members are spaced 16 inches apart. To avoid welding, distortion, and subsequent heat treatment, the vertical members and diagonals are bolted to the main longitudinals, 5/16-inch diameter nickel steel bolts and 7/16-inch heavy tube spacers are employed insuring excess sheer and bearing strength. This type of construction is believed by the manufacturer to be superior to welded joints, since it provides a very rigid beam and permits of repair with ordinary tools. Compression struts are made of ⅞ inch o. d., .057 inch wall duralumin



Three-view outline drawings of the Cunningham-Hall biplane

(Continued on next page)

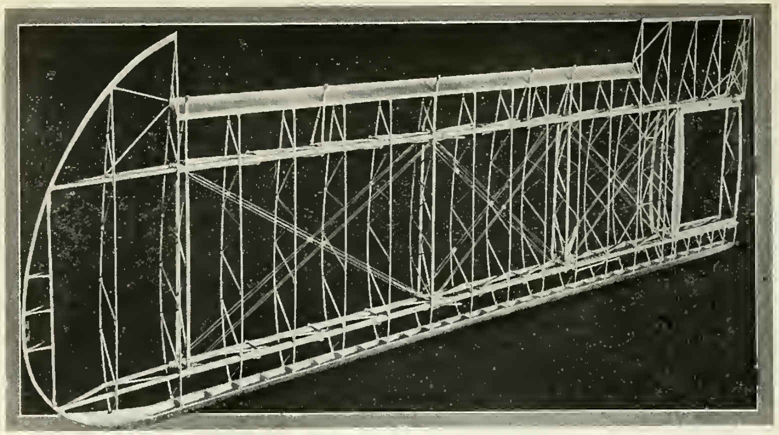
"MANEUVERABILITY"

THOMPSON Aeroplane Valves are made not only to resist the volcanic heat and shock of continuous close schedule operation but to secure that perfectly sealed compression so vital to successful maneuvering. Quicker take-off, climb, and lower landing speed result.

THOMPSON PRODUCTS, INCORPORATED
General Offices: Cleveland, Ohio, U. S. A.
Factories: CLEVELAND and DETROIT

Thompson Valves

Original Equipment in 90% of
American Built Aero Motors



Skeleton framework of the Cunningham-Hall upper left wing panel

(*Continued from preceding page*)

tube, Warren trusses. Aileron hinges are located at compression strut points and transfer aileron forces direct to the beam truss. The leading edge and aileron hinge beam are of heat treated duralumin sheet.

The lower wing ribs are of the same design and material as the upper wing ribs. The beam in the lower wings are large diameter chrome molybdenum steel tubes, heat-treated. The construction follows closely that of the upper wing.

Control surfaces—ailerons, stabilizers, fin and rudder—are all-metal structures. Ribs of control surfaces are made of WD 1025 carbon steel tubes; other members are of the same grade of carbon steel tube and strip and chrome molybdenum steel tube and strip.

The conventional three-member chassis supports the airplane. Careful design has avoided unnecessary universals and secondary members. Bendix wheels with brakes are used. Tires are size 32 inches by 6 inches. The axles are made from 2¼ inches o. d., .120 inch wall chrome molybdenum steel tube, heat-treated to 200,000 pounds per square inch, tensile strength. Aerol struts provide the shock absorbing medium.

In the control system push-pull rods of steel tubes with nickel steel jaw bolts, pins and hexagon head bolts, are used extensively. Aircraft steel cables and turnbuckles are also used in the control system. Cables run through individual aluminum tubes in the cabin walls eliminating all possibility of fouling. Brake pedals, mounting brackets and fittings are high strength aluminum alloy castings. Bolts and pins subject to wear have been chromium plated to prevent trouble in service due to the wearing undersize of such parts.

High standards and rigid specifications govern the selection of all materials. Physical and chemical reports are required from all sources of supply covering each and every lot of material furnished. U. S. Army Air Corps specification materials are used throughout, and standard parts conform to the Army-Navy standards.

High factors of safety have been secured in this design, at the same time the weight of the structure has been held at a low figure. Attention has been given to secure accessibility for inspection and service.

The Cunningham-Hall six-place cabin airplane is powered with the 300 horsepower Wright J-6 engine.

Specifications

Wing area	378 square feet
Weight empty	2,450 pounds
Weight fully loaded	4,000 pounds
Pay load	1,000 pounds
Wing loading	10.5 pounds per square foot
Weight per horsepower	12.5 pounds
Minimum speed	40 miles per hour
Maximum speed	over 130 miles per hour
Cruising speed	110 miles per hour
Time of Climb to 2,000 feet (initial tests),	1½ minutes
Time of climb to 6,000 feet	5 minutes
Landing speed	under 40 miles per hour

BABY ACE MONOPLANE

THE Baby Ace open monoplane was designed by the Topeka Aeronautical Service. This single place plane was produced for student, sport and business purposes. It was tested with a converted Henderson 27 horsepower motor, and developed a speed of 70 miles per hour, and had a landing speed of 30.

The Baby Ace is a monoplane of the parasol type. The wings have truss type ribs covered with cloth, and are braced with streamlined steel struts. The fuselage, undercarriage, and tail group are constructed entirely of seamless steel tubing. There is no wire or rod type trussing in the fuselage structure, and all joints and fittings are acetylene welded. A side door of welded steel tubing gives easy access to the cockpit which is located under the wing. The landing gear is of the high split axle type, with rubber shock absorbers.

The cockpit seat is finished in black leather, and the dash and floor board is finished with crackolack to harmonize with exterior color finish of the plane. The instrument panel has an oil pressure gauge, altimeter, ignition switch, and throttle control.

Control is effected by the standard stick and rudder bar, with all connections entirely enclosed. The elevators are operated by a positive push and pull rod. The aileron controls are completely enclosed in the wings, with a positive push and pull rod running from the fore spar to the aileron. The rudder is controlled by the conventional cables attached to the rudder bar.

The engine mount, constructed of seamless steel tubing, is detachable, and will carry any motor of not more than 60 horsepower.

Specifications

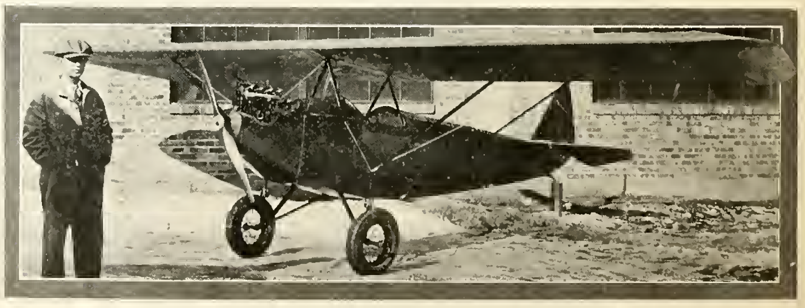
Span	25 feet
Chord	4.5 feet.
Length overall	16.5 feet
Height	6 feet
Wing area	108 square feet
Weight empty	300 pounds
Useful load	200 pounds
Gross weight loaded	500 pounds
Gasoline capacity	5 gallons
Oil capacity	1 gallon

Performance (estimated)

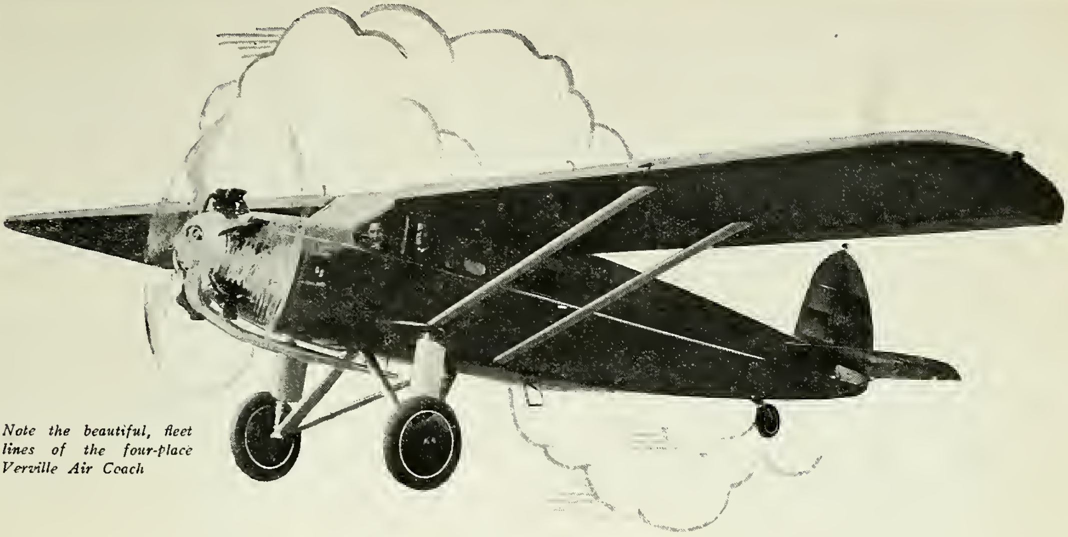
Take-off	100 to 150 feet
Landing speed	30 miles per hour
High speed	70 miles per hour
Cruising speed	60 miles per hour

NEW MOBILE 'AERO H' ENGINE OIL

MOBILOIL Aero H was developed recently by the Vacuum Oil Co. for use under the severe heat and pressure conditions imposed by long distances, heavy loads and continuous operation at high speed. Its outstanding features, according to its manufacturer, are exceptional lubricating ability under high temperatures, freedom from carbon in the makes and types of aircraft engines for which it is recommended, and unusually low consumption per horsepower hour. This new lubricating product will be incorporated in the recently published Gargoyle Mobiloil chart for airplane engines.



With a 27 h.p. engine, the Baby Ace has a speed of 70 m.p.h.



Note the beautiful, fleet lines of the four-place Verville Air Coach

YOU KNOW THESE MEN

. . . and these men know airplanes

Out of the autograph book at the Verville Booth at the Detroit Show, we pick a few expressions concerning the Verville Air Coach

"The Verville Air Coach is one of the prettiest ships I have ever seen, and has wonderful vision."—Charles L. Lawrance.

* * *

"Just about the nicest thing in a cabin job I have seen."—George Wiese.

* * *

"Verville rings the bell again. But for that matter, he never has had a dud."—Carl B. Fritsche.

* * *

"The most beautiful lines of any of the new planes. How does Fred do it?"—Lester D. Gardner.

* * *

"With Verville's usual unusualness."—James H. Doolittle.

"The most appealing single-engined plane in the show."—William B. Stout.

* * *

"The most cleancut monoplane I have had the pleasure of inspecting, and I was particularly impressed with the wonderful visibility afforded the passengers and pilot."—Jack O'Brien, *Air-mail Pilot.*

* * *

"The best cabin plane in its class."—E. M. Laird.

* * *

"The finest coach work in the show."—J. Don Alexander.

All of this tells just one story:

"The Air Coach was the sensation of the Detroit Aircraft Show."

A matter of pride with the private owner. A matter of economy with the operator. Territory is available for competent distributors.

THE VERVILLE AIRCRAFT COMPANY
7424 MELVILLE AVENUE
DETROIT, MICH.

STEARMAN COACH

THE Stearman Aircraft Company, of Wichita, Kansas, introduced its newest product—the Stearman Coach—at the recent Detroit aviation show. In order to meet the demand of the individual aircraft owner who desires not only the reliability of performance, which is basic nowadays in aircraft manufacturing, but also the last word in comfort, convenience, luxury of appointment and beauty of line and color, Lloyd Stearman, president and chief designer of the Stearman organization, and Mac Short, chief engineer, collaborated in designing the new coach to meet these requirements.

Finished in attractive two-tone combination of cream and tan with cream and red, trimly set off with a black band and black striping, the new cabin biplane, entirely glass-enclosed, offers 360 degrees of vision, with clear overhead vision in addition. From its deeply upholstered cushioned seats, with high back supports, to its unusually large and accessible luggage compartment, entered through doors built into the body, it is the embodiment of luxurious air travel. A paneled indirectly lighted control board contains every instrument which the modern pilot finds useful in piloting under any practical condition, with night flying and "blind" flying given especial consideration.

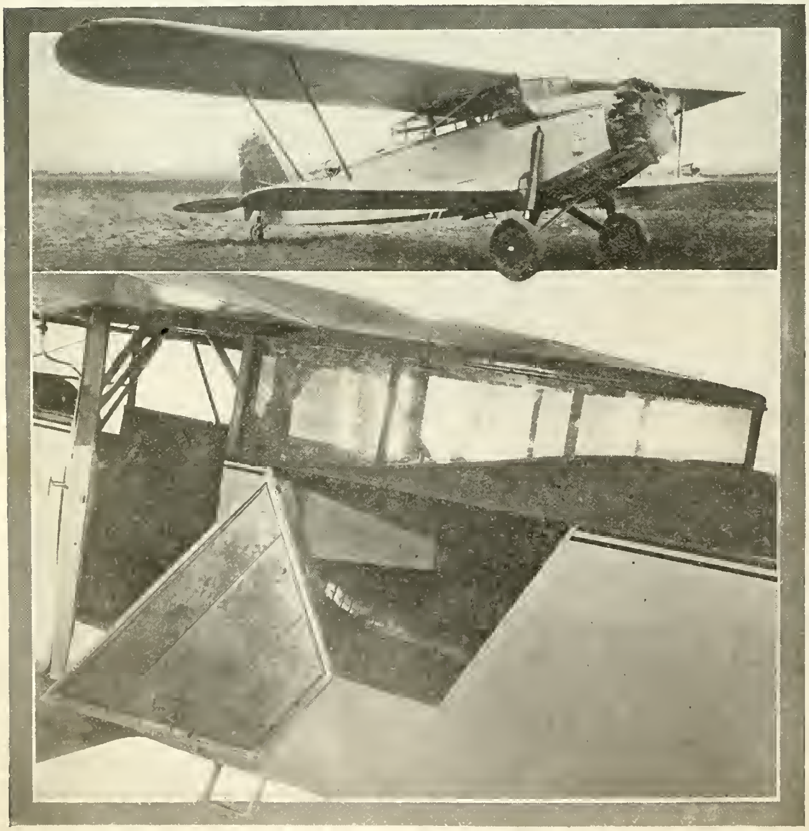
The ship is powered with an R-975 or Wright 300 horsepower J-6 Whirlwind 9-cylinder engine, which gives it under actual test, a maximum speed of 135 miles an hour, a cruising speed of 115 miles an hour, and a landing speed of 47 miles an hour. The service ceiling is 16,000 feet, and the rate of climb at sea level is 900 feet per minute. Net weight of the new model is 2,565 pounds, and gross weight 4,270 pounds, allowing for a pay load of 780 pounds, pilot, 110 gallons of fuel (660 pounds), and 10 gallons of oil (95 pounds).

Equipment includes landing lights, landing flares, navigation lights, complete dual (side by side) controls including brakes, generator, electric inertia starter, complete indirectly lighted instrument panel, safety equipment of the latest design, sound insulated cabin, cabin heaters, and other features in keeping.

Fuel tanks are located at three points: a 25-gallon tank in each wing, utilizing gravity feed, and a 70-gallon tank below the floor, from which fuel is drawn by an engine driven pump, with a wabble pump for emergency use. The total fuel capacity is 120 gallons, and oil capacity is 12 gallons.

Quantity production of the new model will not get under way, according to officials of the factory, for about 60 days, which will allow sufficient time for installation of necessary new machinery, dies, jigs, etc. In the meantime, officials of the Stearman Aircraft Company are touring the country in the ship to determine its performance characteristics over a long period and under a variety of conditions.

The instrument equipment includes flight indicator; altimeter, air speed indicator, rate of climb indicator; tachometer; two oil pressure gauges (crankcase and inlet temperatures), and an eight-day clock.



The Stearman Coach powered with a 300 h.p. Wright Whirlwind engine.

WARNING FLARE SYSTEM

TO provide an adequate system of warning pilots in emergencies, the Department of Commerce has established rules for the flaring-down of fliers. Flares are to be placed firmly in the ground before lighting, and at such a point that the distance from nearby objects will be ten times the height of such objects, and at least 100 feet distant from any red obstruction light. When two flares are used, they will be placed 50 feet apart and at right angles to the course. The signals must be displayed twenty minutes before the plane is due.

To fill demands for longer burning flares, tests of flares of different sizes were made recently by William T. Miller, airways extension superintendent, and Thomas A. Lee. The visibility was very good with slight ground mist, and from a distance of 10 miles and an altitude of from 1,000 to 5,000 feet, the ⅞-inch red flare was picked up and its brilliancy increased rapidly upon approaching the field. The distinguishing distance of this type of red flare was about 5 miles. The 1-inch red flare appeared to be a trifle more visible and slightly more luminous at the 10-mile distance. The 1¼-inch red flare was very readily picked up at the 10-mile distance, and its luminous capacity greatly increased upon approach and in a very marked degree over the other two red flares.

COMBINATION PRIMER PUMP AND SHUT-OFF

THE Lunkenheimer Company of Cincinnati, Ohio, has developed a new Primer Shut-off Cock combination. Its function is to provide a rich mixture which facilitates quick starting of aircraft engines. In cold weather, especially, it is valuable in feeding extra gasoline to the motor until it is warmed up and is running smoothly.

A feature of this new device is that both the primer pump and shut-off cock are mounted on the instrument board so that the shut-off cock is at all times under the observation of the pilot.

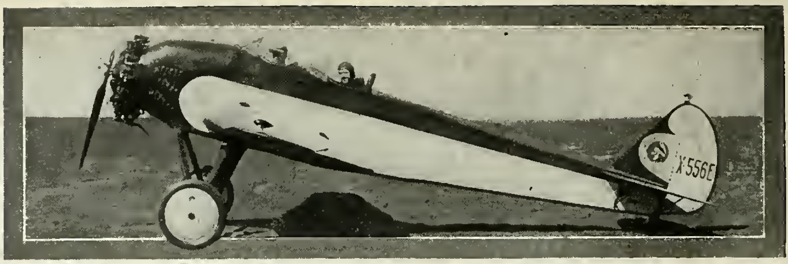
The combined fitting is furnished as part of the standard equipment with the new Wright J-6 series Whirlwind. It has received the approval of both the Army and Navy.

The new primer with discharge and other fittings is illustrated in complete detail in the Lunkenheimer Aircraft Specialties Catalog No. 2. This catalog also illustrates and lists a complete line of cocks, pipe and tubing fittings for Aircraft, both Air Corps standard parts and commercial fittings.

The entry of Deep Rock into aviation is significant and full of promise. There is no factor in the petroleum industry with a better record of accomplishment or a greater store of material and personnel assets.

SHAFFER
OIL and REFINING COMPANY
General Sales Offices: 300 W. Adams St., Chicago

THE MOHAWK "REDSKIN" AND "SPURWING"



The open cockpit Mohawk "Spurwing," a 2-place monoplane.

To meet an increased demand for planes particularly designed for sports and training purposes, and for the transportation of business executives and salesmen on hops about their trade territory, the Mohawk Aircraft Corporation of Minneapolis has developed the Mohawk Redskin and a sister ship, the Mohawk Spurwing.

The general construction of the two ships is nearly identical, except that the Redskin is a three-place cabin plane while the Spurwing is a two-place ship with an open cockpit and a good sized baggage compartment. The color scheme is cream and wine.

The company began to manufacture the Pinto in 1927. Since then it has produced this ship in increasing quantities until at present the factory is on a plane-a-day basis. The Pinto has approved type certificate No. 95. Production will be increased when the additional models, the Redskin and the Spurwing are under way.

The wings are tapered and are of the internally braced, full cantilever type. Reinforced plywood webs with spruce flanges are supported by front and rear box type spars. Drag bracing is of heat-treated chrome nickel steel and consists of 16 tie rods per wing between compression ribs. Inspection plates are provided around the aileron mechanism. The leading edge is of plywood, the whole structure is covered with Flightex fabric and finished in Berryloid or Moralac. All fittings are of chrome molybdenum steel or heat-treated chrome nickel steel.

The engine is mounted on a welded steel structure of chrome molybdenum tubing, with four-point support.

Ailerons and tail surfaces are of fabric covered steel frames. The fin is adjustable on the ground. The fin area is 3.375 square feet or 2.41 per cent of the wing area; rudder area 5.82 square feet or 4.15 per cent of the wing area; adjustable stabilizer area 15.50 square feet or 11.07 per cent of wing area; elevator area 11.125 square feet or 7.95 per cent of wing area; ailerons have a total area of 10.50 square feet of 8.50 per cent of the wing area.

The dual control mechanism comprises: positive push-pull rod of ⅞" chrome molybdenum steel tubing: stabilizer, push-pull rod of the same material; aileron droop adjustable at ground, torque tube of same material; rudder (tested to 2000 pounds) operated with 19 strand cable. The front stick is of Alleghany rustless non-corrosive nonmagnetic steel, the rear stick of chrome molybdenum heat-treated steel; Bloxham safety stick is optional.

The landing gear includes Bendix wheels with rod controlled brakes; U. S. Rubber smooth tread tires, three-leaf spring steel tail skid with a Stellited shoe; Gruss or Oildraulic shock absorbers. The wheel tread is 8 feet 5 inches.

The tanks are forward gravity feed and the plumbing is of annealed copper tubing. There is a three-gallon emergency standpipe connection.

Navigation lights and blinkers, dash lights and dome lights are included in the cockpit accessories, and the instruments include altimeter, oil pressure gauge, oil temperature gauge and tachometer. Optional instruments are: compass, air speed indicator and inclinometer.

The seats are of steel tubing, rigid frame, moss filled, and the upholstery is of Radel cowhide, lizard skin finish.

Following is a resumé of the specifications of the Redskin and Spurwing:

Specifications

Length overall	23 feet
Height	7 feet 9 inches
Span	34 feet 11 inches
Wing loading	12.15 pounds per sq. foot
Power loading	15.45 pounds per h.p.
Wing area	140 square feet
Mean dihedral	2 degrees 45 min.

Performance

Top speed at sea level	140 miles per hour

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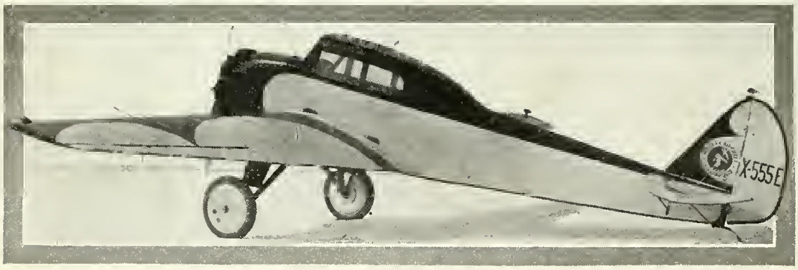
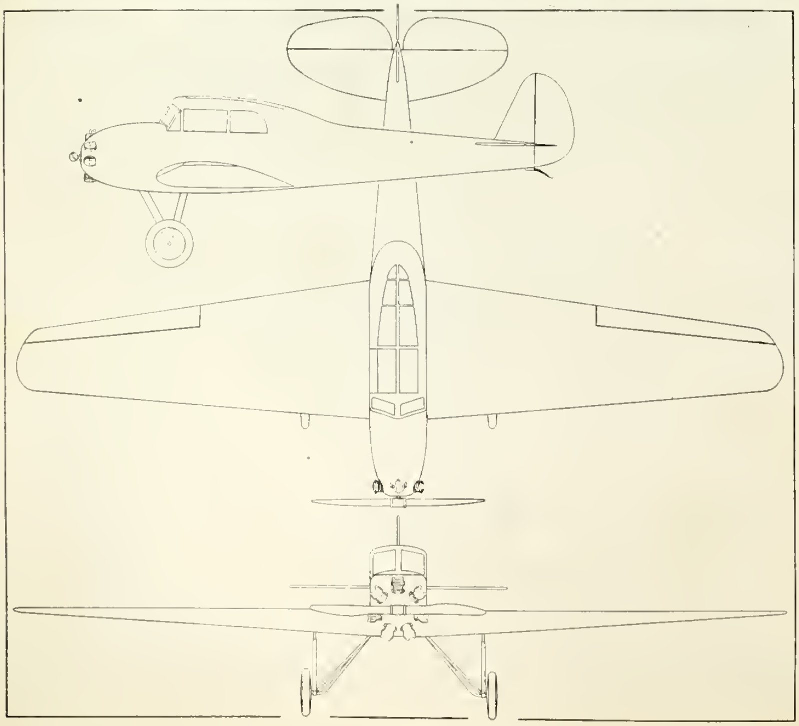




The Mohawk "Redskin", a 3-place cabin monoplane with a Warner engine.

An Announcement

THE new SIEMENS-HALSKE engines, built to meet American conditions and backed by the experience of one of the world's largest aviation engine manufacturers, are now available in the following power ranges:

Sh-13, 5 cyl.	80 H.P.
Sh-14, 7 cyl.	110 H.P.
Sh-12, 9 cyl.	125 H.P.

SIEMENS-HALSKE radial air-cooled engines will meet all your power requirements. Deliveries can be made immediately from stock. Service is available by factory trained men.

K. G. FRANK
Consulting Engineer
75 West St. New York City

General Representative for

SIEMENS & HALSKE, A. G.

(Continued from preceding page)

Cruising speed	119 miles per hour
Landing speed	37 miles per hour
Cruising range	600 miles
Rate of climb, first minute	1,100 feet
Service ceiling	15,000 feet
Absolute ceiling	17,500 feet

Weight Data

	Redskin	*Spurwing*
Weight empty	1,000 lbs.	925 lbs.
Useful load	700 lbs.	775 lbs.
Pay load	370 lbs.	445 lbs.
Gross load	1,700 lbs.	1,700 lbs.

Power plant	Warner Scarab	Warner Scarab
Rated power at 1850 r.p.m.	110 h.p.	110 h.p.
Maximum power at 1925 r.p.m.	120 h.p.	120 h.p.

The Wright 150 horsepower engine and Eclipse starter are optional equipment.

TWIN-ENGINED MOHAWK

THE conservative private owner, the traveling man who must be assured of reaching his destination on time and the aerial photographer who is required to fly over places where a forced landing would be dangerous, have all been considered in the design of the twin-motored Mohawk monoplane. Investigation showed that the twin-motored plane of this type as compared to the single motored plane has a ratio of 900 to 1 against the possibility of a forced landing. The ship is designed to fly on one engine and fuel is carried for a 5-hour radius at cruising speed.

With its low wing and low center of gravity, the possibility of overturning, even in abnormal take-offs and landings, is extremely remote; in the cabin design, however, a load factor of 2 plus has been achieved to provide for safety in the event of overturning.

Accommodations are provided for three persons; the two side-by-side seats forward and a single seat aft. Dual controls are installed. Good visibility is one of the prominent features of the cabin design.

The engines are inverted four-in-line air-cooled "Rover" engines manufactured by the Michigan Screw Corporation. Each engine delivers 60 horsepower. The engine nacelles are offset laterally so that the centers of propeller thrust are not in line with the flight path. The vertical fin is quickly adjustable during flight to 4 degrees either side of the center line to compensate for the torque when flying on one engine. The rudder is of the balanced type.

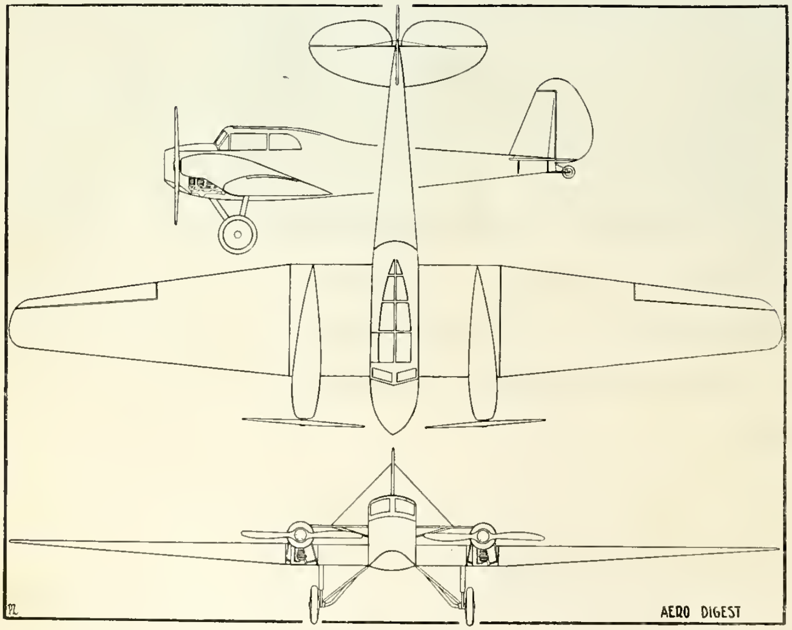
The center section, or stub wing, has a 9 foot span. It is covered entirely with plywood.

The wing has a span of 44 feet and the length of the machine, overall, is 26 feet. Ailerons are of the modified Friese type.

Bendix wheels and brakes are used, with 28 by 4 inch Royal cord tires and Gruss shock absorbers. The tail wheel is of the pneumatic type, 10 inches by 4 inches.

Empty, the twin-motored Mohawk weighs 1,400 pounds; it can carry a pay load of 600 pounds, bringing the total gross weight to 2,000 pounds. Its high speed is 105 miles an hour and the cruising speed 90 miles an hour.

Mr. J. D. Akerman, chief engineer of the Mohawk Company is a pioneer in the design of low-wing monoplanes, the types developed for years by his company meeting with high favor in its particular field. The general structural features of the twin-motored design follow those of the "Pinto," "Redskin" and "Spurwing" types, single-engined commercial low-wing monoplanes which have proven their ability in actual service.

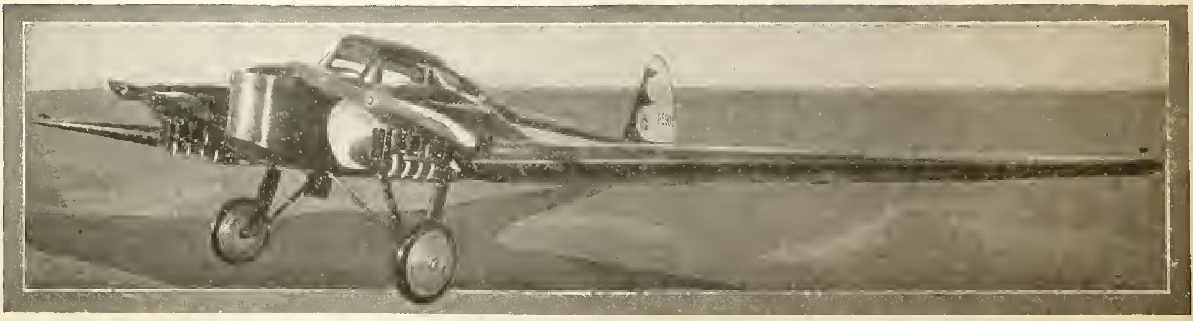


General outlines of the Mohawk cabin plane powered with twin engines.

N.A.C.A. REPORT ON DIFFERENT WING SETS

RESULTS of an investigation of the aerodynamic characteristics of an airplane equipped with several different sets of wings were published recently by the National Advisory Committee for Aeronautics in Report 304. The findings of the investigation are presented in tabular and curve form.

This investigation was conducted by the National Advisory Committee for Aeronautics at Langley Field, Virginia, at the request of the Army Air Corps, for the purpose of comparing the full scale lift and drag characteristics of an airplane equipped with several sets of wings of commonly used airfoil sections. A Sperry Messenger airplane with wings of R. A. F.-15, U. S. A.-5, U. S. A.-27, and Göttengen 387 airfoil sections was flown, and the lift and drag characteristics of the airplane with each set of wings were determined by means of glide tests.



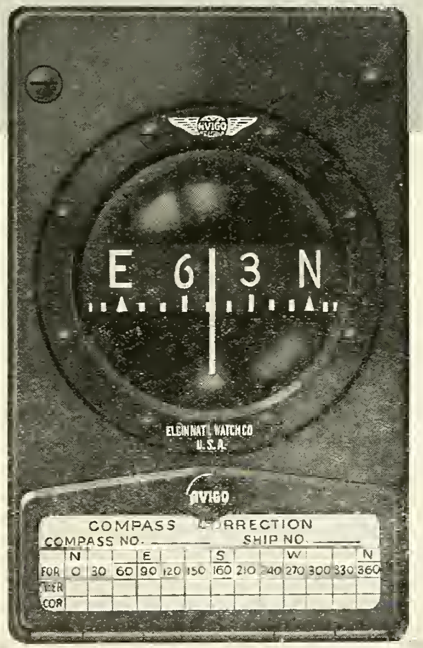
Inverted air-cooled 60 h.p. "Rover" engines power the new "Mohawk" twin motored plane.

THIS COMPASS HAS AN AVERSION TO SPINNING

Many a worthy pilot has blistered the air with his epithets over the antics of a compass that will spin and oscillate. The New Avigo compass built by Elgin is remarkably free from oscillation. Period is less than 20 seconds—two-thirds of Air Corps requirement.

It's extremely light (1.4 lb.). Costs but $42.50 (luminous card and lubber line $2 extra). Occupies little space and yet is exceedingly easy to read due to the magnifying effect of the spherical lens. It's a fit companion to the Elgin Chronometric Tachometer and the Elgin Ball Bank Indicator.

AVIGO
ELGIN



AERONAUTICAL CHAMBER OF COMMERCE

AIRCRAFT INSTRUMENT DIVISION

ELGIN NATIONAL WATCH COMPANY

ELGIN, ILLINOIS

Central Distributors—Johnson Airplane &
Supply Co., Dayton, Ohio

TECHNICAL REPORTS

A LIST of recent technical reports, documents, pamphlets, etc., made available for distribution and loan by the office of Aeronautical Intelligence, is given below. Unless otherwise indicated, copies of these reports may be obtained from the National Advisory Committee for Aeronautics, 3841 Navy Building, 17th and B Streets, N. W. Washington, D. C., upon application. Those marked with an asterisk (*) have not been duplicated and are available only for reference or loan. The distribution of these reports is, however, necessarily limited; hence the committee asks that requests be made for copies only of such reports as contain material of interest to those interested in the problem involved. In making requests for copies of reports, please indicate number and title in each case.

Full scale tests of wood propellers on a VE-7 airplane in the Propeller Research Tunnel, By Fred E. Weick. (No. T.R.-301).

An investigation of the aerodynamic characteristics of an airplane equipped with several different sets of wings. By J. W. Crowley, Jr., and M. W. Green. (No. T.R.-304).

Landing and braking of airplanes. By Louis Breguet. (Translated from La Chronique des Avions Breguet,) (No. T.M.-507).

Aeromechanical experimentation (Wind tunnel tests). By R. Katzmayr. (Trans. from Luftflotten). (No. T. M.-508).

An analysis of a rectangular monoplane with hinged tips. By S. B. Gates. (No. R&M-1175).

The change in airscrew characteristics with height. By A. E. Woodward Nutt. (No. R&M-1178).

Investigation of damping liquids for aircraft instruments. By G. H. Keulegan. (No. T. R.-299).

Impact waves and detonation. By R. Becker. Part I. (Trans. from Zeitschrift fur Physik.) (No. T. M.-505 Pt. I).

Impact waves and detonation. By R. Pecker. Part II. (Trans. from Zeitschrift fur Physik.) (No. T.M.-506 Pt. II).

Morane-Saulnier 180 light airplane (French). By Andre Frachet. (Trans. from "Les Ailes"), (No. A. C.-93).

Anti-seize for use with threaded parts of aluminum alloy. (No. BATN-200).

The force acting on a body placed in a curved and converging stream of fluid. By Prof. G. J. Taylor. (No. R&M-1168).

Photographs of streamers illustrating the flow around an airscrew in the vortex ring state. By C. N. H. Lock. (No. R&M-1167).

Full scale tests on a thin metal propeller at various tip speeds. By Fred E. Weick. (No. T. R.-302).

The gaseous explosive reaction—a study of the kinetics of composite fuels. By F. W. Stevens. (No. T. R. 305).

Mechanical control of airplanes. By H. Boykow. Translation from 1927 Yearbook of the Wissenschaftliche Gesellschaft fur Luftfahrt. (No. T. M.-504).

Determination of the rates of descent of a falling man and of a parachute test weight. (No. ACIC-628).

Nieuport-Delage 640 (French). Commercial high-wing monoplane. Taken from manufacturer's circular received from Paris Office. (No. A. C.-92).

The behavior of a single crystal of α-iron subjected to alternating torsional stresses. By H. Gough. (No. R&M-1148).

Wind tunnel experiments on a model autogyro at small angles of incidence. By C. N. H. Lock and H. C. H. Townsend. (No. *R&M-1154).

DAMPING LIQUIDS FOR INSTRUMENTS

N. A. C. A. REPORT No. 299

REPORT 299 of the National Advisory Committee for Aeronautics entitled "Investigation of Damping Liquids for Aircraft Instruments" covers the results of an investigation carried on at the Bureau of Standards with the financial assistance of the National Advisory Committee for Aeronautics. G. H. Keulegan, of the Bureau of Standards, submitted the report which covers the technical features of the investigation.

The apparatus consisted of four capillary-tube viscometers, which were immersed in a liquid bath in order to secure temperature control. The method of calibration and the related experimental data are presented in detail.

RECENT PATENTS

THE following patents of interest to readers of AERO DIGEST recently were issued from the United States Patent Office. Copies thereof may be obtained from R. E. Burnham, patent and trade-mark attorney, Continental Trust Building, Washington, D. C., at the rate of 20c each. State number of patent and name of inventor when ordering.

Pontoon-attaching means. Arthur R. Stalb, Jr., Farmingdale, N. Y., assignor to Fairchild Aviation Corporation, New York, N. Y. (No. 1,704,713).

Aeroplane. Gustavus Bess, Seattle, Wash. (No. 1,704,719).

Helicopter aeroplane. Frank B. Many, Cleveland, Ohio. (No. 1,704,753).

Flying-machine. Alfred Herbert, Montclair, N. J. (No. 1,704,831).

Parachute for aeroplanes. William J. Hall and Cyrus F. Willard, San Diego, Cal. (No. 1,704,891).

Airplane take-off. William E. Gale, Dallas, Tex. (No. 1,704,968).

Combination airship and aeroplane. Peter Arndt, Los Angeles, Cal. (No. 1,705,170).

Landing-gear. Edward G. Schleicher, Mount Vernon, N. Y. (No. 1,705,210).

Airship. Philip C. Traver, Lynbrook, N. Y. (No. 1,705,346).

Airplane. George Albert, Prescott, Ariz. (No. 1,705,387).

Airplane landing apparatus. Pliny K. Westcott, Brooklyn, N. Y. (No. 1,705,432).

Helicopter-type flying-machine. Frank Mladinich, New York, N. Y. (No. 1,705,489).

Aeroplane. Frank L. Riffert, Haubstadt, Ind. (No. 1,705,535).

Spring opener for pilot parachutes. John J. Coughlin, Dayton, Ohio, assignor to Follmer, Clogg & Co., New York, N. Y. (No. 1,705,854).

Aviator's helmet. Alfred A. Rodgers, Los Angeles, Cal., assignor to Scully Bros., Inc., same place. (No. 1,705,879).

Landing-gear for aeroplanes. Harry T. Booth, Freeport, N. Y., assignor to Leonard W. Bonney, Flushing, and Kirkham Products Co., Garden City, N. Y. (No. 1,705,896).

Aeroplane. Emry Davis, Clearwater, Fla. (No. 1,705,904).

Parachute. Jennings De Witt, New York, N. Y. (No. 1,705,909).

Airplane-launching gear. Charles F. Jenkins, Washington, D. C. (No. 1,706,065).

Airship. Alfons Schaefer, Brooklyn, N. Y. (No. 1,706,080).

Aircraft covering. Isadore M. Jacobsohn, Chicago, Ill., and Starr Truscott, Birmingham, Ohio. (No. 1,706,294).

Gas-retaining fabric. Isadore M. Jacobsohn, Chicago, Ill., and Starr Truscott, Birmingham, Ohio.

Airship. Eugene Brunner, Akron, Ohio, assignor to Luftschiffbau Zeppelin Gesellschaft mit beschrankter Haftung, Friedrichshafen, Bodensee, Germany. (No. 1,706,397).

Airship mooring and transporting device. Beno Schnitzer, Akron, Ohio, assignor to Luftschiffbau Zeppelin, etc. (No. 1,706,414).

Anchoring device for airships. Beno Schnitzer, Akron, Ohio, and Wilhelm E. Dorr, Friedrichshafen, Germany, assignors to Luftschiffbau Zeppelin, etc. (No. 1,706,415).

Airplane drive. Noah Moser, Long Beach, Cal. (No. 1,706,457).

Safety attachment for airplanes. Domenico Pallaria, London, Ontario. (No. 1,706,677).

Floodlight. Oscar Werner, South Bend, Ind., assignor to Westinghouse Electric & Mfg. Co. (No. 1,706,759).

Dirigible. Ralph H. Upson, Birmingham, Mich., assignor to Aircraft Development Corporation, Detroit, Mich. (No. 1,706,830).

Auxiliary and movable wings to be brought in use on the departure and on the landing of high-speed aeroplanes. Fernan O. Conill, Marseille, France. (No. 1,706,956).

Aeroplane. George W. Ray, Forty Fort, Pa. (No. 1,707,177).

Automatic pilot for airplanes. Lawrence B. Sperry, Garden City, N. Y., assignor to Sperry Gyroscope Co., Brooklyn, N. Y. (No. 1,707,690).

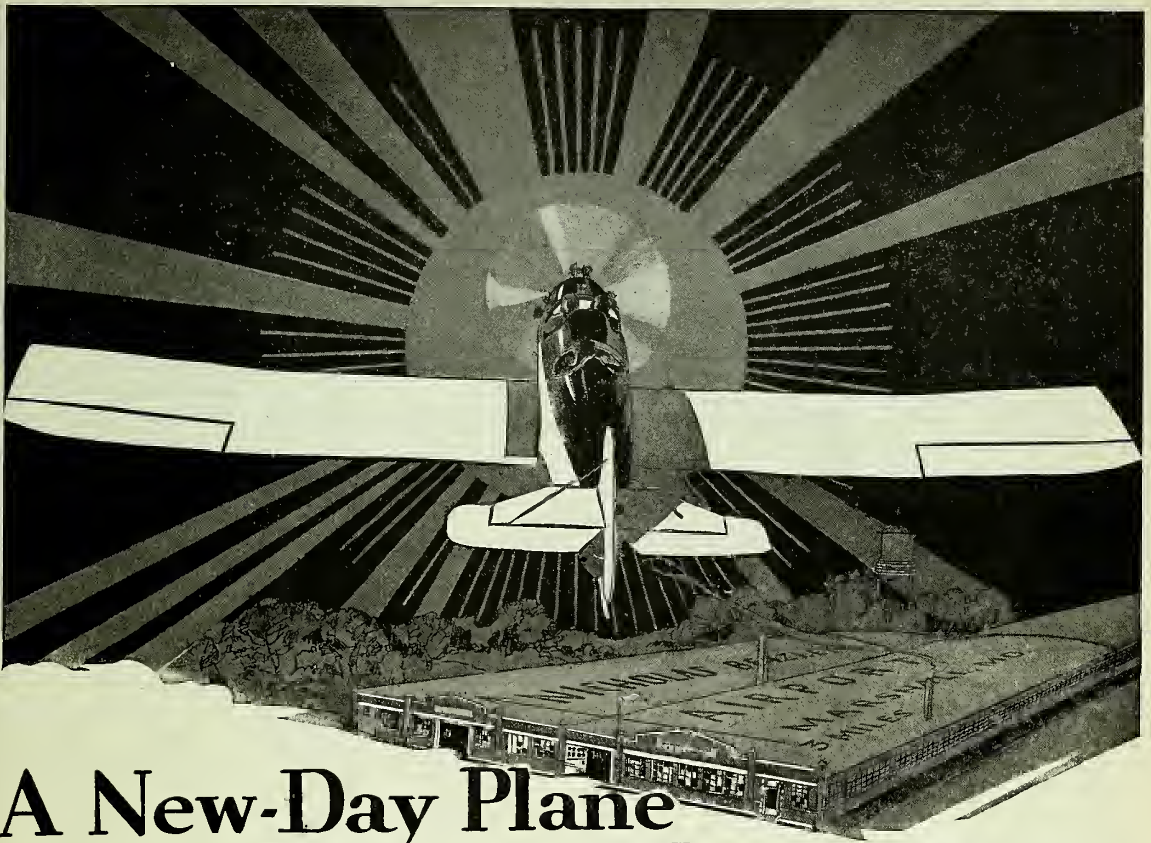
Exhaust-muffler for radial-cylinder engines of aircraft. William Wait, Jr., Garden City, N. Y., assignor to Curtiss Aeroplane & Motor Co. (No. 1,707,830).

Airplane. Carl C. Abel, Rockford, Ill. (No. 1,708,249).

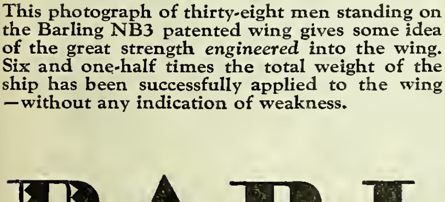
Control-surface-operating mechanism. Frederick R. Weymouth, Buffalo, N. Y., assignor to Fairchild Airplane Mfg. Corp., New York, N. Y. (No. 1,708,373).

Radial aero engine. Joseph Felt, Detroit, Mich. (No. 1,708,611).

Aeroplane. Willard R. Custer, Washington, D. C. (No. 1,708,720).



A New-Day Plane *with a* Background *and a* Future



Surprising Wing Strength

This photograph of thirty-eight men standing on the Barling NB3 patented wing gives some idea of the great strength *engineered* into the wing. Six and one-half times the total weight of the ship has been successfully applied to the wing —without any indication of weakness.

The New-Day Barling NB3 takes off from a background of established stability. Its manufacturers, the Nicholas-Beazley Airplane Co., Inc. are not adventurers in the field of areonautics. This firm, already America's foremost aviation supply house, enters the manufacturing division with experience—valuable in both the production and marketing of this New-Day Plane.

And the NB3 is not just another airplane. It is an entirely new conception of construction and performance—embodying the qualities that give popularity and salability.

Performance is phenomenal. Record after record has been shattered by the NB3—and inherent stability permits the novice to fly it with ease.

Amazingly low in price, this all-metal structured, three place, low-wing monoplane, completely equipped, is only $3600—fly away Marshall.

Successfully established dealers may still obtain franchises in a few desirable territories.

NICHOLAS-BEAZLEY AIRPLANE COMPANY, Inc.
Manufacturing Division Marshall, Missouri

BARLING NB3
Monoplane

HISTORY OF THE BARLING NB-3

EIGHT years ago Russell Nicholas and Howard Beazley, two farsighted young men of Marshall, Missouri, foresaw the enthusiasm for aeronautics that now sweeps the country. The war was over, the world had been shown the inestimable value of the airplane, but commercial aviation had been practically at a standstill. They determined to start then despite the apathy of public interest and to grow as the industry itself grew. And they made their plans accordingly.

Today the Nicholas-Beazley Airplane Company is one of the foremost aviation supply houses in America. Its business extends from one side of the world to the other. In nearly every vicinity where planes are flown the name of Nicholas-Beazley is known. There are but few airplane manufacturers in the country who have not, at some time or other, bought parts and supplies from them. From them the pilot may buy anything from a spark plug to a completely equipped airplane ready to fly.

Service and supply stations authorized by Nicholas-Beazley are rapidly being established in an international chain. Reputable dealers in all parts of the world are being granted franchises as official representatives of the company. The purpose of this is to bring about a world-wide group of establishments so located that pilots may always be within reach of a dealer whose parts, supplies and service are known to be reliable. Thus in practically any country it will soon be an easy matter for a pilot to obtain the same quality and brand of goods, with the Nicholas-Beazley guarantee behind it, that he uses in his home port.

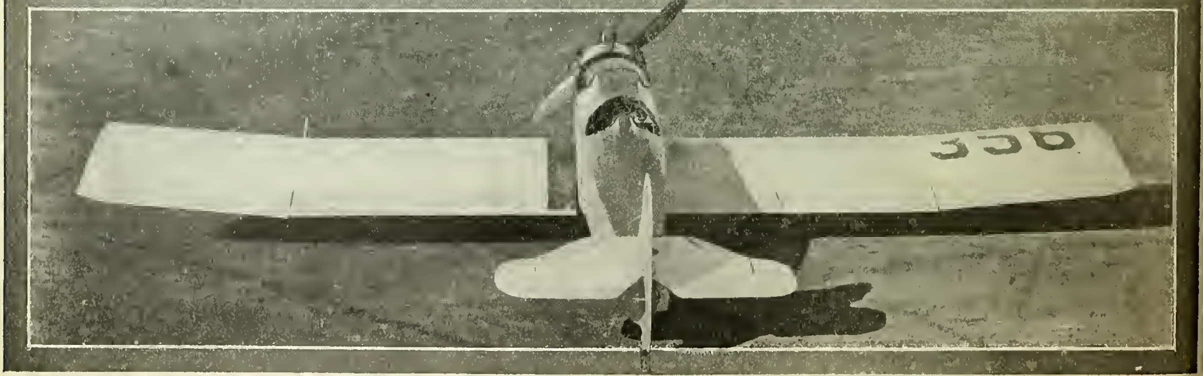
Forward section of the Barling NB-3 monoplane.

Six years ago at the National Air Races in St. Louis, Mr. Nicholas and Mr. Beazley met Walter H. Barling, who during the World War was head of the Experimental Department of the British Air Service and later was connected with the United States Air Service. Mr. Barling is recognized as one of the leading authorities on airplane design. He told them of a plane that he had been working on for years—a plane in which he had incorporated new theories of aerodynamics, new ideas in design and new principles of construction. Nicholas and Beazley decided that they would some day build this plane. Consequently, they arranged an agreement with Mr. Barling; when Barling had his plane developed to his satisfaction, he was to bring it to them and they would build and market it. At that time they had only a small supply business, but whatever they lacked in means was adequately compensated for by their determination to build up a substantial organization.

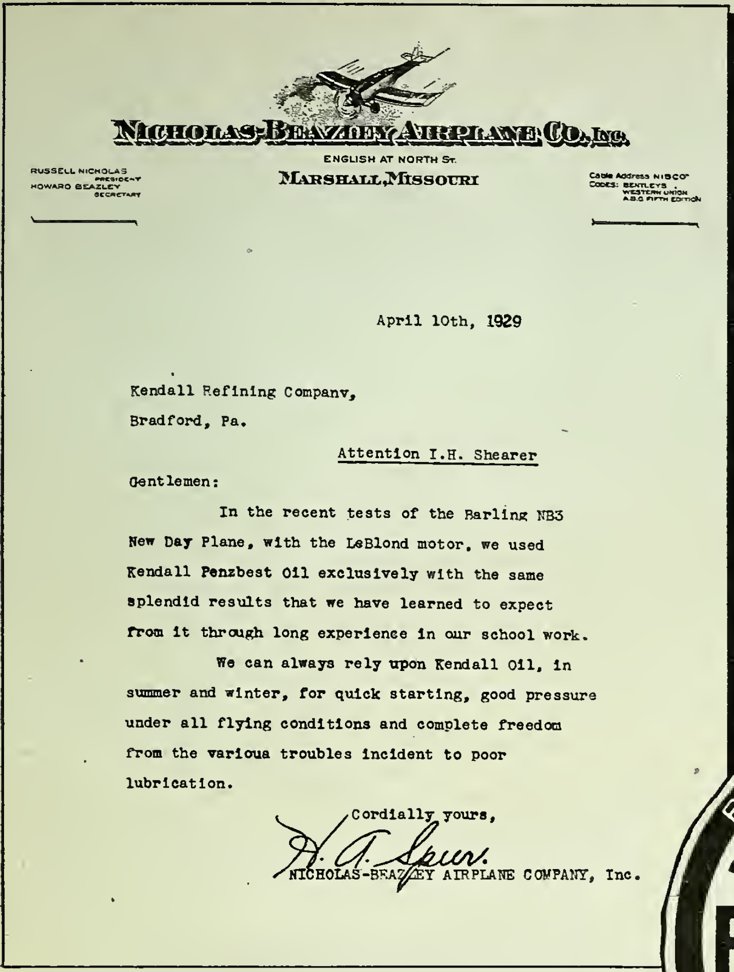
Within a period of six years they found not only a way to build the Barling monoplane, but have also established one of the largest businesses of its kind in the world. They now own and operate the large and successful Marshall Flying School. And now they are producing the Barling NB-3 low-wing, all-metal structured monoplane. The confidence of the aeronautical world in the name of Nicholas-Beazley is evidenced by the fact that many of these planes have been sold in all parts of America "sight unseen."

And now a word about the designer. Walter H. Barling is the designer of the giant Barling Bomber which flew successfully with a total load of thirty-one tons. This is the largest load ever taken off the ground by any heavier-than-air craft, a feat regarded as a remarkable accomplishment.

Mr. Barling's experience gained while he was in charge of the Experimental Department of the British Air Service during the World War brought to light the need of wing construction which could be subjected to bullets and shrapnel and still resist structural failure. Since that time, or during the last fourteen years, he has devoted his attention to the design and construction of the type of wing structure now used in the NB-3. This new design, which is patented in the United States and foreign countries, is a method of structure which eliminates the conventional double wing spars and, owing to the disposition of the



Main wing and horizontal tail contours are clearly shown in this rear view of the new Barling NB-3.



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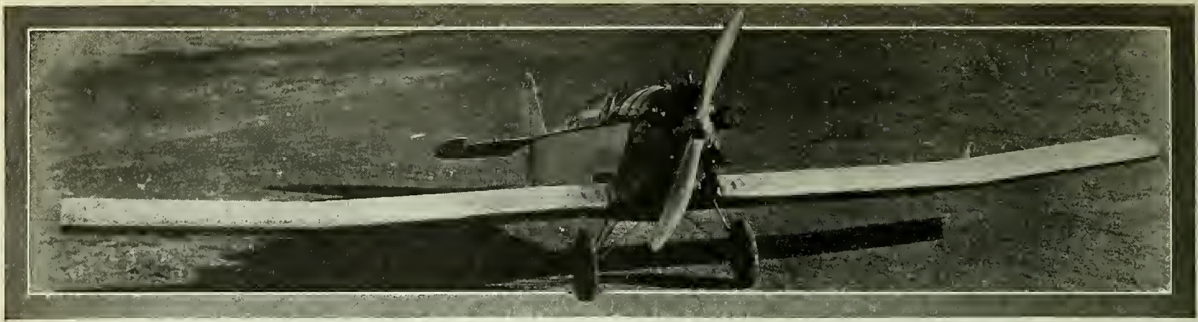

View of the Barling NB-3, showing the low wing arrangement and the dihedral of the wing panels.

materials of its construction, under excessive strain, is not subject to critical stress at any one point. The entire wing is constructed over a large U metal box of the full cantilever type, using no struts, wires or external fittings.

The NB-3 is so designed from a manufacturing standpoint that the entire structure is made by machinery, eliminating hazards that may be caused by the human element. It is so designed and constructed that no rigging is necessary during the life of the ship, an attribute which greatly reduces cost in operation as well as in maintenance. Its design and construction permit complete inspection, an uncommon feature in the average all-metal wing.

This complete wing structure weighs less than 165 pounds and it has been subjected to thorough static or sand test loads which proved that the structure is probably the lightest and strongest known.

The entire wing may be removed from, or attached to, the fuselage in less than twenty minutes, simply, and with no problems of alignment. The split axle landing gear is made of oil tempered chrome molybdenum steel streamline tubing, with shock cord to care for landing stress. The entire gear is placed well forward almost directly under the nose, which with its pronounced slant forward, precludes the possibility of nosing over. Wheels are 24 by 3 and streamlined with aluminum discs. The tread width is 4 feet 9 inches. At the top of the tubes of the landing gear, fitting tubes are attached which are inserted into welded fitting tubes on the lower longerons and thus the landing gear may be held in place by stout pins running through the fitting. The gear is quickly and simply attached or detached.

The wing is a striking departure from accepted designs and particularly as to the blunt, non-tapered and up-tilted tips. The tip panels measuring 5 feet 6 inches are detachable from the main wing, which measures 20 feet 6 inches, but they are of the same type of construction with the single exception that ailerons are attached in place of trailing edge ribs. The dihedral angle of five degrees is obtained by the thrust tube attachments at the point of contact of the main wing and tips which tilt the outer panels to give the dihedral.

Stability is inherent in level flight and ordinary banks are executed with ease while recovery from every banking angle is quick and almost automatic. "Hands off" flying in adverse wind currents in a number of instances has proved this particular adaptation of the dihedral to possess self-righting qualities.

The special airfoil section, Barling 90-A, has demonstrated excellent lifting ability. Both the camber of 11¼ inches and the chord of 5 feet 2 inches are constant over the entire span of 32 feet 6 inches.

The fuselage is streamlined from propeller spinner cap to rudder. Throughout the entire length of 21 feet 6 inches, the proportions are carried out by aluminum framed fairings. The upper part of the landing gear is shielded by an aluminum framed balsa cover, the streamlining back of the cockpits and the fairing on the under side of the fuselage help to complete the attractive contour.

Even the gas tank on top of the fuselage immediately back of the firewall, performs its function of streamlining by its curved profile. The gas tank is readily accessible and may be dismounted by unscrewing the clamps on two retaining bands. The streamline head rests for both cockpits and the fairing on the under side are integral parts of the structure.

Tail surfaces are conventional with the single exception of the distribution of area. Both rudder and elevators are balanced. The stabilizer and

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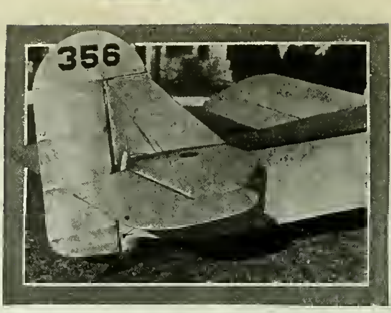
BARLING NB3

fin are adjustable on the ground only; since all weight of payload is carried over the center of gravity there is no need for the stabilizer to be adjusted in flight.

The rudder is fastened with tubing hinge joints at three points, one at the fin and two on the fuselage; the elevator is hinged to the stabilizer.

The spring tail-skid is attached to the tail post of the fuselage.

Ailerons are differentially operated by control tubes attached to the ailerons. The push and pull type control tubes are shielded within the wing and connected with a lever device within the wings which is attached to a double tram cable operating through the wing to both lever devices. The control stick "tree" attaches to the cable. Ailerons are hinged at three points to the main metal spar of the wing. The total aileron area is 19 square feet.



Tail group of the Barling NB-3.

Fabric covering is used on all surfaces. The particular construction of the wing allows an unusually good airfoil section with fabric covering, the leading edge being rounded by sheet duralumin.

The engine mounting, not being interchangable, is welded securely to the frame of the fuselage. Cowling is made up of numbered pieces securely held into place by button-type fasteners. The cowling follows through between the cylinders of the motor to the spinner of the propeller.

Pilot and passenger chairs are made of upholstered duralumin with webbing seats. Floor boards are of plywood. Both pilot and passenger are comfortably inclosed within the protection of the streamline cowlings.

The ship weighs less than 700 pounds complete, has a top speed of over 105 miles an hour fully loaded. It has a climb of more than 800 feet a minute—with a 60 horsepower engine. The average plane of this type weighs around 1,300 pounds empty and with a 90 horsepower engine has a maximum speed of from 90 to 100 miles an hour and a climb of from 300 to 500 feet a minute.

The factory in which the NB-3 is built is a paragon of efficiency, methods employed and equipment used. More than eighty per cent of the materials used in the construction of the NB-3 are machine made. This, coupled with the line method of assembly, enables quantity production without the sacrifice of the many necessary inspections and close supervision. Parts assembled on precision jigs are certain to fit when making replacements.

The high standard maintained in production may in a large measure be attributed to the specialized machinery used. Equipment includes special jigs, saws, presses and furnaces, designed and built especially for use in the Nicholas-Beazley factory.

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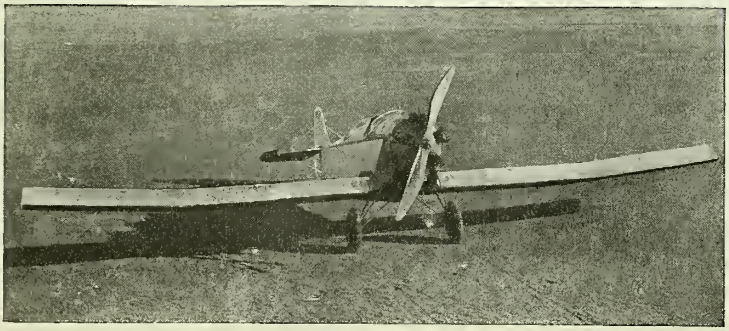

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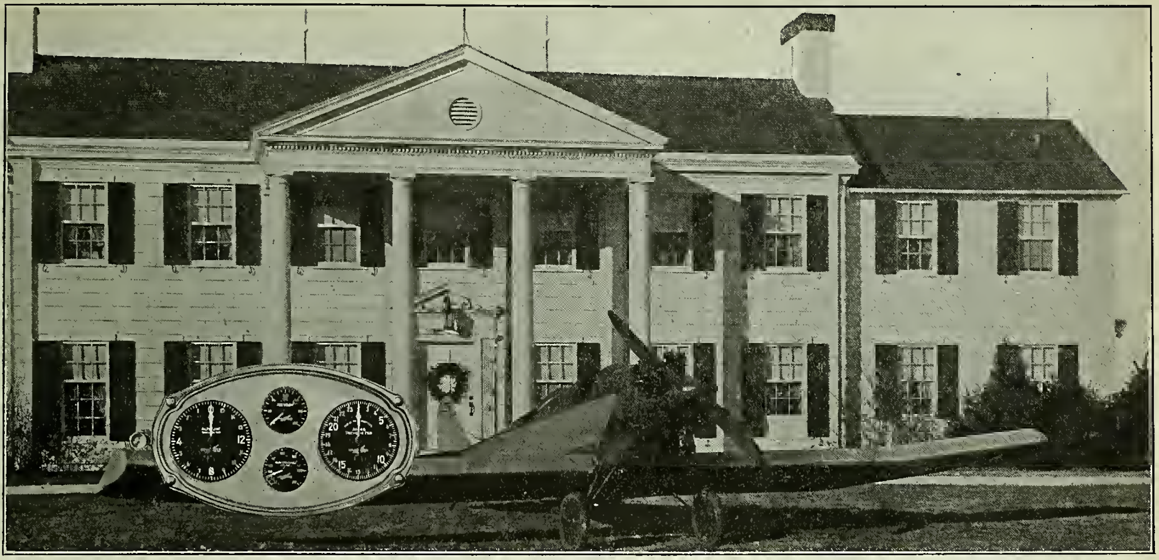

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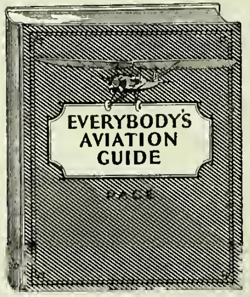

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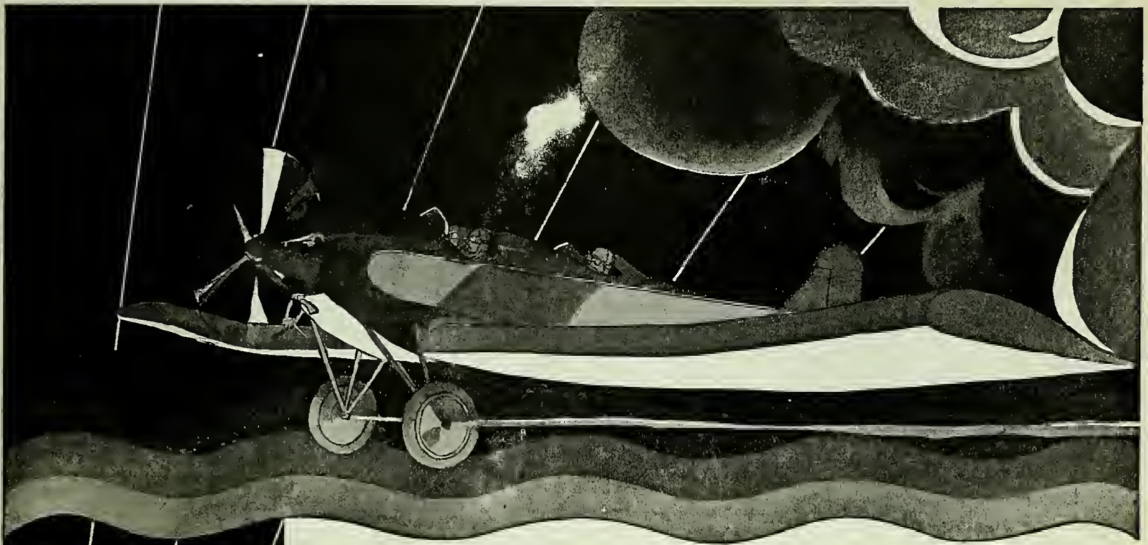

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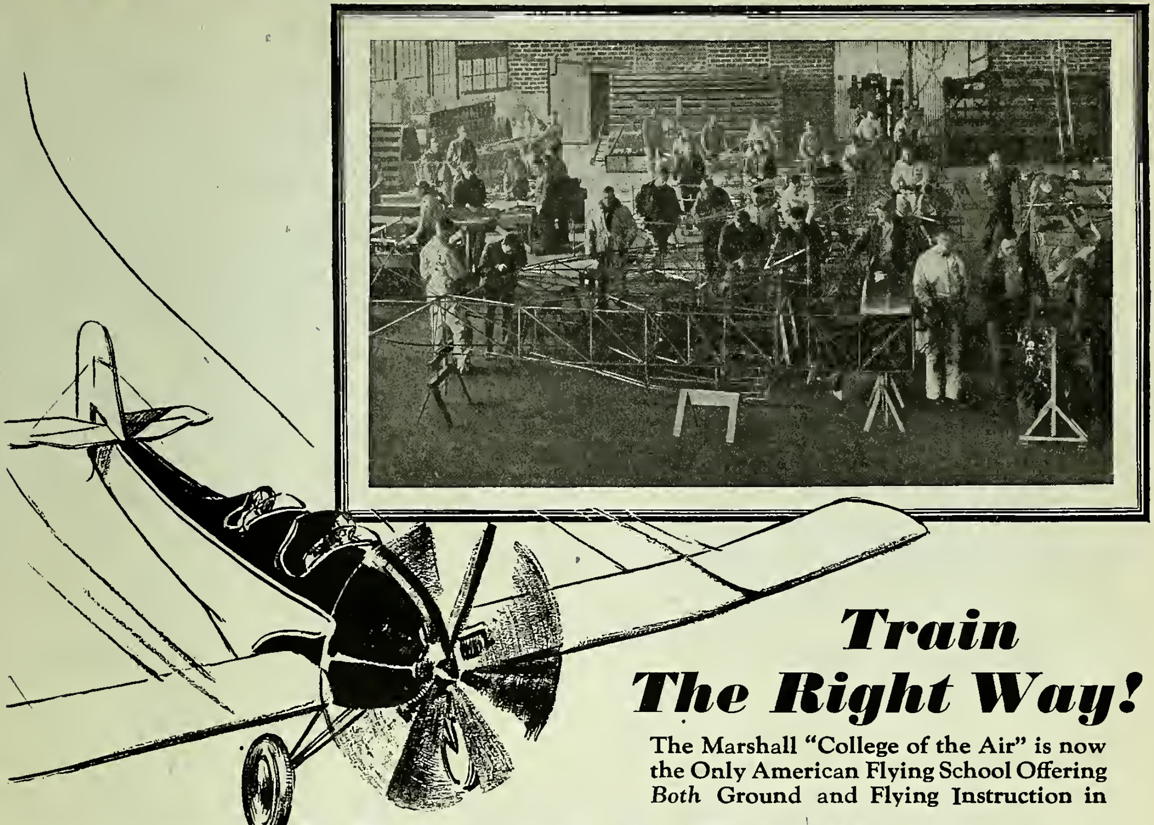

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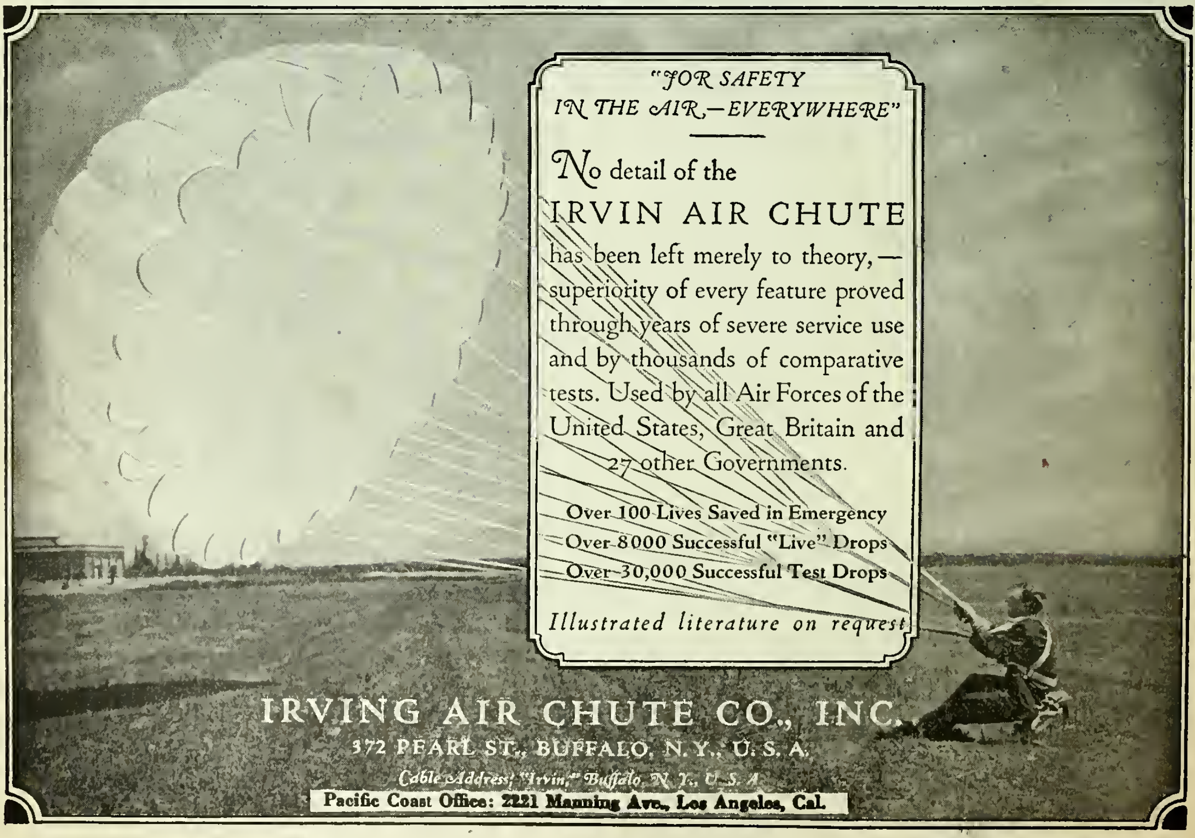

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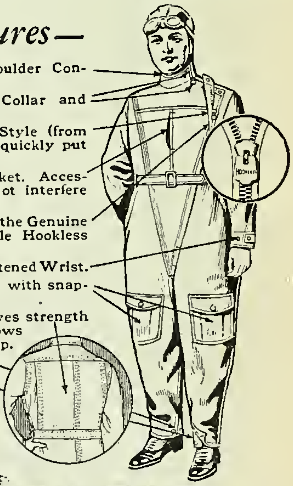


Lee UNION MADE WHIZIT
Flying Suits ~ Union-Alls

Mail THIS COUPON *Today!*

H. D. Lee Mercantile Company
Kansas City, Mo., Trenton, N. J.
South Bend, Ind., Salina, Kans.
Minneapolis, Minn.
San Francisco, Calif.

Please mail me prices and full details on the Lee Whizit Flying Suit.

Name ____________________

Address ____________________

Printers

To "His Majesty," The Barling NB-3

THE organization which is helping the Barling NB-3 gain deserved recognition is ready to help other manufacturers merchandise their products. This organization specializes in direct-mail advertising and printing of a high standard of excellency and effectiveness. Ask us for suggestions on your problems. Ask us for samples of our work for other firms.

THE HUGH STEPHENS PRESS

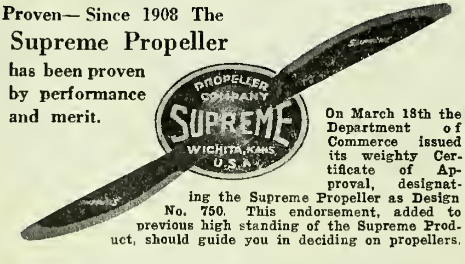
Advertising—Printing

JEFFERSON CITY, MO.

Proven—Since 1908 The

Supreme Propeller

has been proven by performance and merit.



On March 18th the Department of Commerce issued its weighty Certificate of Approval, designating the Supreme Propeller as Design No. 750. This endorsement, added to previous high standing of the Supreme Product, should guide you in deciding on propellers.

Supreme Propeller Co.

WICHITA, KANSAS

Formerly STONE PROPELLER CO.

That the

NICHOLAS-BEAZLEY AIRPLANE COMPANY, *Inc.*

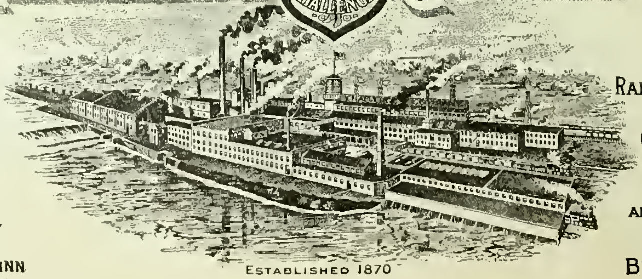
after careful deliberation, chose

AERO DIGEST

as the medium in which to launch their intensive merchandising campaign is one more concrete example of this publication's rating in the industry.

CHALLENGE COMPANY

TANKS AND TOWERS FOR AUTOMATIC SPRINKLER SYSTEMS A SPECIALTY



WOOD TANKS FOR RAILWAY WATER STATIONS CHEMICALS VINEGAR PICKLES AND ALL OTHER PURPOSES

BRANCHES, MINNEAPOLIS, MINN.
KANSAS CITY, MO.
OMAHA, NEB.

ESTABLISHED 1870
MAIN OFFICE AND FACTORY
232 RIVER ST ~ BATAVIA, ILL.

BRANCHES, CHICAGO ILL
CLEVELAND, OHIO

840 MILLION PASSENGERS

LAST year the railroads of the United States carried some 840 million passengers — an overwhelming throng of travelers, millions of whom would have gladly journeyed by air had they been able to do so at a fare comparable with railroad rates. 840 million transients! Truly an inspiring market for future air transportation when air-rates are popularly priced!

The Allmetal Flamingo enables the air-line operator to establish low inter-city rates immediately and profitably. Rates need no longer be excessive in order to pay the heavy maintenance and depreciation charges incident to the operation of fabric covered planes — or to guard against the uncertain life and high operating costs of such equipment.

The flying costs of the Allmetal Flamingo are the lowest per passenger mile of any transport plane in its class in America today, because:

The long life of the metal used in its construction has been thoroughly demonstrated. Depreciation on the plane therefore becomes a neglible item.

The unique method of fabrication employed permits easy inspection and servicing in the field, reducing maintenance charges to the minimum.

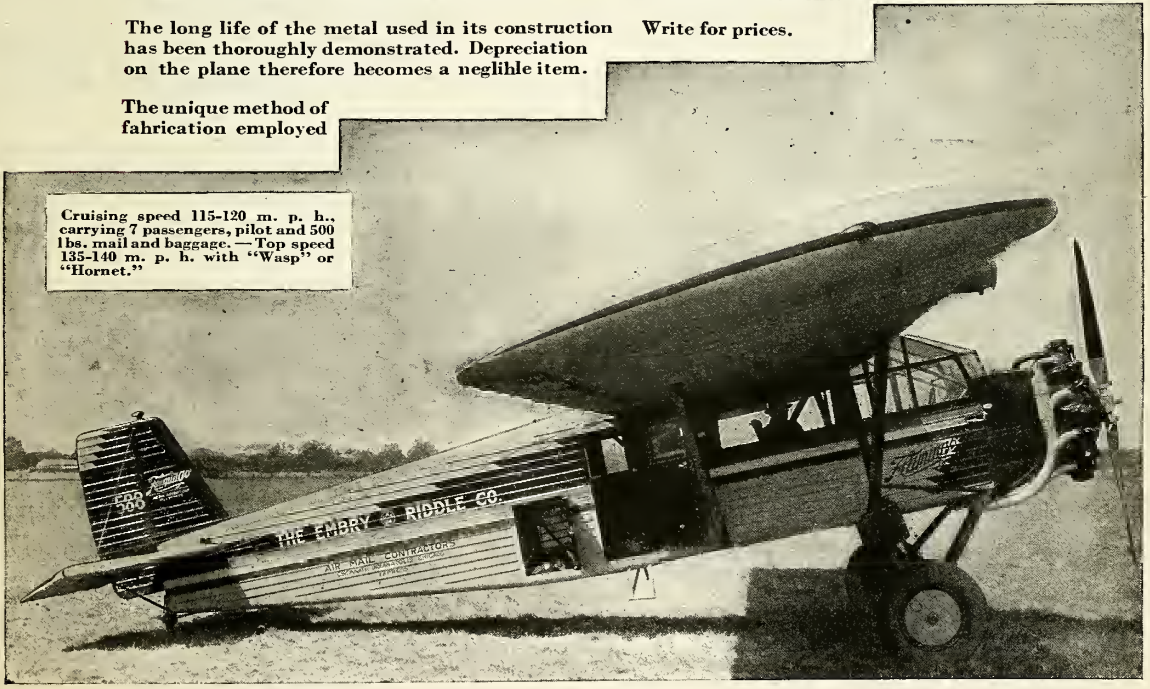
The engines used are of proven dependability. They will economically carry heavy loads at high speeds.

The carrying capacity of 7 passengers, pilot and 500 pounds of mail and baggage is ideal for day-in day-out service. — Not too large as to be unprofitable when traffic is temporarily dull.—Economically sized for taxi and sight-seeing work when not on scheduled runs.

The initial cost of the Allmetal Flamingo is practically the same as that of wood and fabric planes of equal capacity.

The Flamingo is especially built for the 840 million travelers who require the utmost in safety at low fares — and for the operator who desires to earn the largest dividends on his investment.

Write for prices.



Cruising speed 115-120 m. p. h., carrying 7 passengers, pilot and 500 lbs. mail and baggage. — Top speed 135-140 m. p. h. with "Wasp" or "Hornet."

ALLMETAL FLAMINGO

The METAL AIRCRAFT CORP.
CINCINNATI

In the Air . . . .

The Famous Bennett System, Based on *More* Actual Flying Experience —Satisfies All U. S. Standards Thoroughly and Quickly . . . .

Easy Time Payments!

There is only one way to enter the widening field of aviation—prepare yourself to command the best the game offers!

Otherwise, you would not consider deserting your present job—your present position in life. Otherwise you would not consider the higher type of training offered by the famous Bennett System—thorough, intensive, gruelling training designed to actually qualify you for a U. S. pilot's or mechanic's license beyond question—and yet in the shortest possible time!

But this complete course of preparation is within reach of every ambitious man—for our time payment tuition plan says—Start your training today with a reasonable enrollment fee—and complete the balance after graduation—after you're flying—in easy monthly installments!

Famous For a Higher Training Standard—Greatest Growth in Our History

Bennett students learning aerial photography, an important part of Bennett training.

The Bennett System of flying instruction pioneered a higher standard of training, which, not only ourselves, but the most reputable schools in America have found necessary. In the beginning, Dr. Bennett carefully considered every phase of the exacting requirements of the government. And the famous Bennett system parallels these definite requirements in every particular.

We have found that it paid not to "cut the corners"—to make this training course complete. For, since January 1, students have come from every part of America, establishing the greatest growth in our history.

Flying Time Records Fall—200 to 250 Hours Accredited Weekly!

Every week, Bennett students are setting records for accredited flying time rarely equaled by any other civilian schools in America. Our organization of student mechanics and instructors has been ordered to keep all Bennett planes in the air—every daylight hour, if possible. For we realize that time means money to our students now—when flying organizations throughout the world are clamoring for *trained* pilots and mechanics. Just for instance, former Bennett students who graduated a few short months ago are today flying Tri-motored Wasps, Stinson's Ryan's, and Curtiss' in all parts of America.

and

A GUARAN

Read Remarkable

Due to the tremendous demand for skilled pilots in which neither we nor any of the other reputable flying schools are able to any where near fill the demands for men—we feel it is possible to make this outstanding offer for May—

We'll guarantee a job immediately upon graduation to the first fifty students who enroll for our transport course!

Class in mechanics learning all type motors, part by part.

What Bennett Training Means

The famous Bennett System includes four thorough courses, starting with ground mechanics covering every phase of airplane construction, trouble shooting and repair and study of all type motors—the private pilot's course, the limited commercial 50-hour-after-solo course and the famous transport course of 200 hours after solo and including navigation, aerodynamics, aerobatics, meteorology and actual cross country flying!

..On the Ground

BENNETT, the Southwest's Largest School of the Air, Offers All Modern Equipment—Larger Shops—All Licensed Mechanics—MORE FOR YOUR MONEY!

...Last Call for 1929!

Even if you start your training now, during May, you will barely have time to complete our thorough higher courses by late fall. This is the last call for the far-sighted men who will get in the game during 1929—the big year!

Whether you are interested in the mechanic's or pilot's license, Bennett will train you thoroughly in every phase of the work you intend following as your life's career.

TEED JOB

This Offer for May

And we back this offer up by way of a tremendous refund in tuition in the event we fail to live up to this pledge! Naturally, we are not able to state the full terms of this guarantee in an advertisement. Write for the unconditional guarantee to these fifty fortunate men, today—and remember, we make it only after calculating the cold facts—after receiving wire after wire for pilots that we have been unable to furnish!

Bennett Makes It Possible to Start Your Career Now!

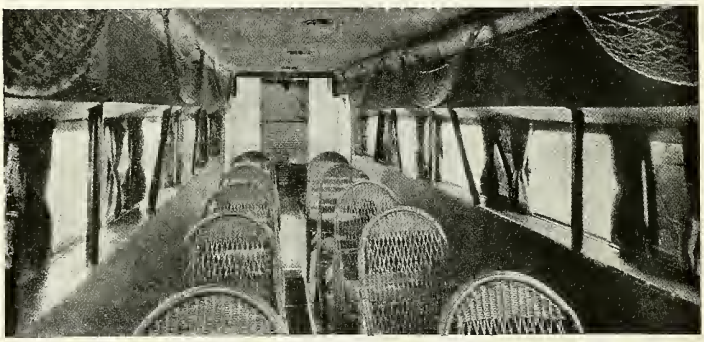
So far, every single prediction made concerning aviation's growth during 1929 has been fulfilled. Transport and air mail lines are opened daily; manufacturers and business men are buying planes by the hundred; every airplane factory is running full capacity.

Can you possibly afford to wait longer to begin your training?

Start for Kansas City now! Remember, if you enroll among the first fifty students who enter during May, we guarantee a job following graduation! Time Payments! We pay your bus fare from any point in the U. S. A.

There is only one other thing we can do—and that is to sincerely and honestly urge that you come now—for aviation's development is actually amazing.

Shoot the coupon back right now for full details, our complete manual of courses and U. S. pilot's requirements.



Multi-motored "air liners" like this soon will link every part of the civilized world.

Bennett students reciving technical instruction through our new system of illustrated lectures

For Free Book
Free Bus Fare

EARN $300.00 *to* $900.00 MONTHLY

BENNETT FLYING SCHOOLS
Division of Bennett Airways, Inc., Distributors of Eagle Rock Planes
423-427 W. Sixth Street, Kansas City, U. S. A.
Branch Schools: Pittsburg, Kas.; Chanute, Kas.; Coffeyville, Kas.; Okmulgee, Okla.

Please send your free book and copy of U. S. regulations governing the licensing of pilots, details of your time payment plan, refund of bus fare, and guarantee offer for May.

I am____________old (over 18).

NAME____________________

TOWN____________STATE____________(AD-5)

ROBIN —*Training*

Makes STUDENTS

Better PILOTS . .

More QUICKLY . .

The quiet of the closed-cabin Robin makes conversation easy, thus permitting student and instructor to ask and answer training questions *in the air*—where they count—this saves time and affords more thorough instruction.

Exclusive performance and economy of operation strongly recommend the Robin as the foremost closed-cabin training plane that is available today.

Curtiss

"—WORLD'S OLDEST FLYING ORGANIZATION"

CURTISS FLYING SERVICE, INC.

New York Office—GARDEN CITY—Long Island

Sole Sales Agents for

CURTISS AEROPLANE AND MOTOR CO., INCORPORATED
CURTISS-ROBERTSON AIRPLANE MFG. CO.
CESSNA AIRCRAFT CO.
SIKORSKY AVIATION CORPORATION
IRELAND AIRCRAFT, INCORPORATED
COMMAND-AIRE, INC.

SIKORSKY

AMPHIBION

THE TWIN-ENGINED SIKORSKY AMPHIBION CAN FLY AND CLIMB ON ONE ENGINE WITH A FULL LOAD—IT IS THE SAFEST AIRPLANE IN THE WORLD.

CURTISS FLYING SERVICE, INC.

NEW YORK OFFICE—GARDEN CITY—LONG ISLAND

Sole Sales Agents for

CURTISS-ROBERTSON AIRPLANE MFG. CO. SIKORSKY AVIATION CORPORATION IRELAND AIRCRAFT, INC.
CESSNA AIRCRAFT CO. CURTISS AEROPLANE AND MOTOR CO., INCORPORATED COMMAND-AIRE, INC.

"—WORLD'S OLDEST FLYING ORGANIZATION"

LUKE and FLUKE . . . . . Luke Doesn't Like Competition

IS IT EASY TO BUILD AN ENGINE, LUKE?
SURE, I COULD BUILD ONE MYSELF
THE FIELD
WHY DON'T YOU?
WELL, SON, I WOULDN'T KNOW WHERE TO GET THE WATER OR AIR TO COOL IT
CAFE
I THINK YOURE TRYING TO KID ME; LUKE, HONEST, WHY DON'T YOU BUILD AN ENGINE?
ALL MY TIME'S TAKEN UP TRYIN' TO TEACH YOU TO FLY!
KEEP OUT
WELL, YOU COULD WORK AT NIGHT COULDN'T YOU?
SURE, I COULD, BUT I AIN'T GOT A NATIONAL CHAIN OF SERVICE STATIONS LIKE CURTISS WILL HAVE THIS YEAR — AND WHAT GOOD IS AN ENGINE WITHOUT NO SERVICE?

The CHALLENGER ENGINE Is Known for Its Aerodynamic Efficiency . . . . . .

"It's A Good Engine"

the Challenger can be more effectively streamlined than the usual single-row radial engine. This is due primarily to the staggered arrangement of cylinders, plus the inherently low frontal area of a short-stroke, large-bore engine. These factors are largely responsible for the excellent performance of Challenger-engined airplanes.

CURTISS FLYING SERVICE, INC.

NEW YORK OFFICE—GARDEN CITY—LONG ISLAND

Sole Sales Agents for

CURTISS AEROPLANE AND MOTOR CO., INCORPORATED
SIKORSKY AVIATION CORPORATION CURTISS-ROBERTSON AIRPLANE MFG. CO.
CESSNA AIRCRAFT CO. IRELAND AIRCRAFT, INC. COMMAND-AIRE MFG. CO.

"—WORLD'S OLDEST FLYING ORGANIZATION"

A NATION-WIDE CHAIN OF CURTISS SERVICE STATIONS

Offer Exceptional Advantages to Curtiss Dealers

DEALER TALKS

No. 1

Prospect: "Before buying a plane I want to make sure that I won't have trouble in getting expert service on it. Just what servicing arrangement does your company provide?"

Curtiss Dealer: "The CURTISS FLYING SERVICE maintains an ever-growing chain of service stations where you can get expert service and immediate replacement of parts on Curtiss and associated products."

Prospect: "Can you furnish me with an expert pilot for this plane—one whom I can trust implicitly?"

Curtiss Dealer: "Yes, sir. The CURTISS FLYING SERVICE has furnished me with the names and qualifications of several first-class pilots who are immediately available—if you cared to meet any of them tomorrow . . . . ."

Prospect: "How soon can you give me a demonstration of this Robin that I'm interested in?"

Curtiss Dealer: "If it is convenient to you I will phone the field and arrange for a demonstration this afternoon."

Prospect: "If the demonstration this afternoon is satisfactory, how soon can I have delivery on the plane?"

Curtiss Dealer: "By placing your order today we can give you very good delivery."

THE CURTISS FLYING SERVICE
HELPS EACH LOCAL DEALER

Each Curtiss base is a well-stocked depot where dealers can at all times obtain planes, engines, parts and repairs.

Each Curtiss base is an aviation center where the local public becomes acquainted with Curtiss personnel and products.

Each Curtiss base is convenient for taking quick delivery on planes or parts.

And each Curtiss base is always ready to render dealers a fast and reliable demonstration service *at all times.*

CURTISS FLYING SERVICE, INC.

"—WORLD'S OLDEST FLYING ORGANIZATION"

New York Office—GARDEN CITY—Long Island

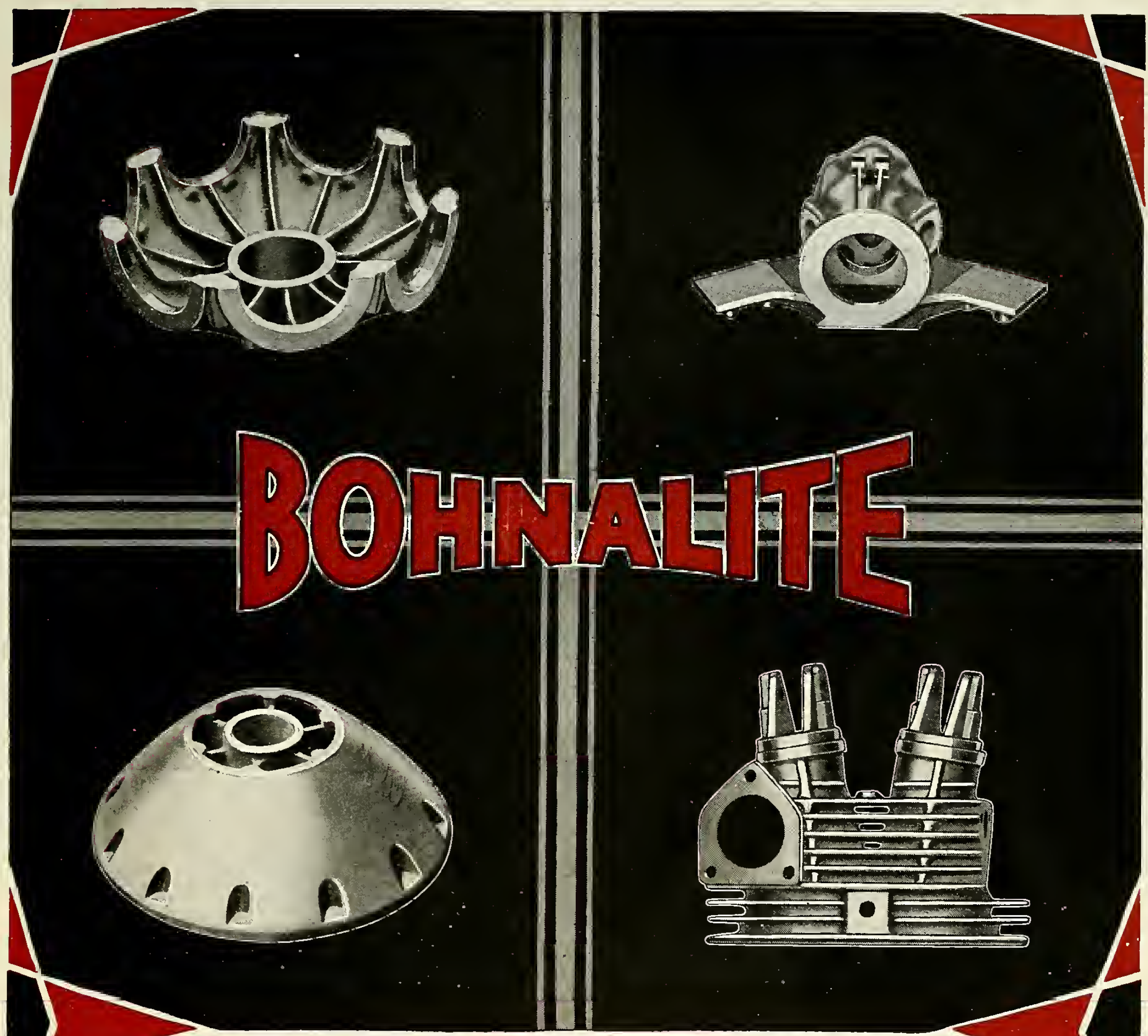
Sole Sales Agents for

CURTISS AEROPLANE AND MOTOR CO., INC.
CURTISS-ROBERTSON AIRPLANE MFG. CO.
CESSNA AIRCRAFT CO.
SIKORSKY AVIATION CORPORATION
IRELAND AIRCRAFT, INC.
COMMAND-AIRE, INC.

You're Safe with this BEARING

RING TRUE
BOHN
BEARINGS

Aircraft Division
BOHN ALUMINUM & BRASS CORPORATION
DETROIT, MICH.
New York Chicago Philadelphia Cleveland Pittsburgh



Light Yet Hard as Iron

That Bohnalite castings consistently pass the rigid tests so necessary in the aircraft industry, is an indication of the high quality of this new light alloy.

Bohnalite is a fine grained—dense—strong metal, having high uniform hardness and excellent bearing qualities.

But, more than that. Bohn aircraft experts know the science of correct pattern making. The necessity of dimensional accuracy is thoroughly understood by Bohn craftsmen.

The special Bohn heat treating processes which give Bohnalite so many valuable properties are also an important contribution.

Send for the interesting new Bohnalite booklet. Also send your blue prints for quotations.

Aircraft Division
BOHN ALUMINUM & BRASS CORPORATION, DETROIT, MICH.
NEW YORK CHICAGO PHILADELPHIA CLEVELAND PITTSBURGH

62% Lighter than Iron

WESTERN NEWS

HERBERT HOOVER, JR., ASSUMES NEW DUTIES

AFTER a number of weeks spent on preliminaries, Herbert Hoover, Jr., has "buckled down" to his job as radio technician for Western Air Express, and is spending most of his time at the radio station at Vail Field, Los Angeles.

Equipment is being received for experimental work in improving the radio communication system now in operation on the airlines between San Francisco and Los Angeles, and the completion of the wireless telephone system projected for use on the Los Angeles-Kansas City line, which will be started after May 1.

Hoover declares the first problem will be improving of the radio contact between the different terminals of the organization where weather reports, air conditions and other flying data may be available for the entire system. The next step in radio communication will be the inauguration of contacts between the ground and the ship. and the final, the two-way contact from ship to ground stations and from ship to ship.

The Federal radio commission has designated certain wave lengths for this work, but the use of these channels for the transmission of miscellaneous messages from passenger to business associates is still a matter of experiment, Hoover declares.

Due to the lack of necessary equipment, radio communication experiments have been carried on with such materials as the individual companies have been able to scrape together, but this situation shortly will be overcome, according to Hoover.

Herbert Hoover, Jr., who is radio technician for Western Air Express

SEATTLE TO ALASKA NON-STOP FLIGHT

THE first non-stop flight from Seattle, Wash., to Juneau, Alaska, was made on April 15 by the Alaskan-Washington Airways with a Wasp-powered Lockheed Vega equipped with Edo floats. The flight was made as the first regular scheduled flight of the Alaska-Washington service. The distance of 1,000 miles was covered in 7 hours 35 minutes, at an average speed of 140 miles per hour.

Ansel C. Eckman piloted the plane, with Robert E. Ellis as navigator and Jack Hallerton as mechanic. The plane used for the trip was the first of six Wasp-powered Lockheed Vega planes which will be used on the Seattle-Juneau service, and which was delivered shortly before the inauguration of the service. These planes are all to be equipped with pontoons.

SCENIC BEAUTY ON NEW AIRLINE

THE colorful, inspiring and historic scenic points of Arizona and New Mexico lie directly beneath the airway over which the giant airplanes of Western Air Express will fly between Los Angeles and Kansas City after May 1, according to officials of the company.

Petrified Forest, Canyon Diablo, Meteor Crater, Painted Desert, Zuni Buttes, colorful mountains rising thousands of feet in the air, rugged buttes, lonely plains with crumbling adobe houses scattered here and there—this is the panorama which will present itself to those comfortably seated in closed cabin planes as they speed over this interesting area.

Leaving Los Angeles, the plane heads in the general direction of Mount Baldy and Mount San Bernardino, skirts Big Bear Lake, goes south of Providence Mountains, a volcanic area, and north of Amboy, Calif. Hualapai peak, east of Kingman, Ariz., rises in the blue sky as a guiding beacon. Round Mountain and Mount Floyd, which snuggle close together as if for company in the barren lands, lie to the north about 25 miles.

When Kingman is reached, the San Francisco Peaks, with an elevation of 13,000 feet, may be seen 125 miles eastward and a bit north of the plane's course.

Canyon Diablo yawns below, and a few miles to the south is Meteor Crater. Then appear the wide open spaces, with buttes and mesas accentuating the severity of the hardships which nature placed in the way of those early travelers and settlers who walked or rode slow-moving beasts.

Soon the Painted Desert, with its riotous and gorgeous colors, comes into sight, in the vicinity of Winslow and Holbrook, Ariz. While flying over the Petrified Forest near Holbrook, the passengers obtain their first glimpse of New Mexico in Zuni Buttes and El Moro or Inscription Rock.

San Mateo Mountains, with Mount Taylor looming up distinctly, lie ahead, and below are vast lava beds, everlasting scars of wounds inflicted by angry volcanoes of centuries ago. South of San Mateo Mountains the speeding plane passes over Laguna, an ancient pueblo whose early citizens would invoke aid of their various gods could they but see the huge monster rushing smoothly along where only birds used to fly.

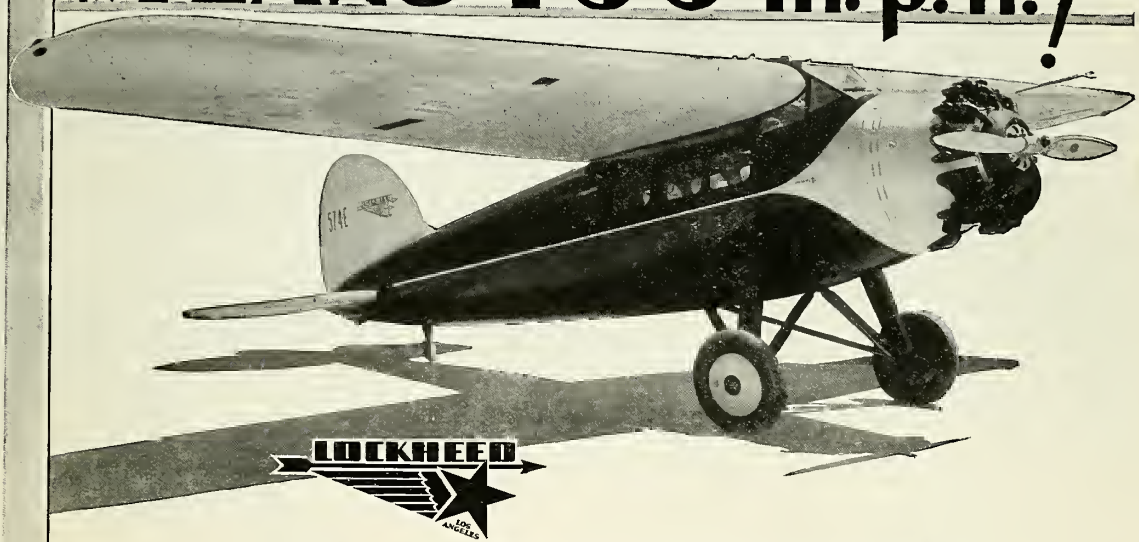
Here and there are old ranches, with their adobe buildings, mile upon mile from any other sign of human habitation. Then comes Albuquerque, the picturesque New Mexico city. where all the flavor and color of this romantic state has been preserved in every way possible.

The next landmark which beckons to the pilot is a pass south of the Sandia Mountains. El Cuervo Butte and a series of mesas and lowlands with tiny buttes scattered about lie ahead. Santa Rosa, New Mexico, swiftly passes beneath, and then, for the first time in hours, steel rails make their appearance. They are the Rock Island line, which from then on is followed into Amarillo, Texas. The route then goes over the fertile fields of Kansas, and Kansas City, Mo., comes into sight.

SEATTLE TO B. C. AIR MAIL ROUTE

BIDS for the proposed mail route between Seattle, Wash., and Victoria, B. C., will close May 6. The contract, which calls for not more than twelve return trips per month, is to start July 1 and expire ten years hence.

WHERE 300 h.p. MEANS 155 m.p.h.!



A *New* Whirlwind-Vega by Lockheed Aircraft Company

Horse Power for Horse Power Lockheed Defies Competition!

Open its throttle wide and experience the *thrill* of 155 honest miles per hour! Nose it up and get the *feel* of 1250 feet per minute climb! Cruise all day at 130 m.p.h. Such is the incomparable performance of this newest Whirlwind-Vega powered with Wright J-6, 300 h. p. engine. ⋆ ⋆ In design and construction as well as in performance and breaking records—*it takes a* Lockheed *to beat a* Lockheed!

Feel secure in the knowledge that every Lockheed is the *super-inspected* product of a highly skilled organization, and that behind the brilliant performance and tremendous speed of Lockheeds are safety factors far in excess of all legitimate requirements. ⋆ With a full realization of responsibility to those who fly, only selected craftsmen of *proven* skill are employed in the construction of Lockheed Aircraft.

Lockheed Monoplanes are fully equipped, including electric self-starter.

LOCKHEED AIRCRAFT COMPANY . . . Los Angeles, U. S. A.

LOCKHEED

ALASKA TO CHILE

PACIFIC COAST LINES of the Boeing System will coöperate with the Aviation Company of the Americas to provide aerial transport service from Alaska to Chile, according to an announcement of Richard F. Hoyt, chairman of the latter organization on April 16. The coördination of the routes, and proposed lines, of the Boeing Air Transport, Pacific Air Transport with those of the Pan American Airways and affiliated companies will effect the 7,800-mile air service.

The agreement will provide for the exchange of passengers between the airlines concerned, and will necessitate the operation of a line from Los Angeles across Mexico and Central America to connect with the Pan American planes at Belize. The Pan American and Pan American-Grace Airways now operate lines to Mollendo, Peru, and plan extensions to Buenos Aires. The Boeing concern has surveyed an airway between Seattle and Juneau. The agreement was made by the Aviation Company of the Americas, controlling the Pan American interests, and the United Aircraft and Air Transport Corporation, controller of the Boeing Air Transport and Pacific Air Transport.

EXOTIC PASSENGERS

A CHANGE of attitude towards the airplane by certain Philippine natives was brought to light recently during a carnival held at Manila, when a visiting potentate, the Sultan of Sulu, was given his first airplane ride by Captain Donald Wilson of the Air Corps.

As may be surmised, the sultan's air journey funrished a big thrill for his retinue, who upon seeing their chief climb out of the plane safe and sound after Captain Wilson landed, took heart and expressed a desire to take a flight also. The sultan's secretary was the next to take a flight. Captain George L. Usher and Lieut. Harold R. Wells, Air Corps, also acted as pilots for those who dared brave the vast spaces above the earth. The President of Bontoc likewise enjoyed his first airplane "hop." Several days later, Captain Wilson piloted three Bogobos over Manila and vicinity and they, too, exhibited delight with their flight and safe return to the line.

These representatives of certain non-Christian tribes of the Philippine Archipelago visited Manila for the purpose of showing one half how the other half lives. While at Manila they were extended an invitation by Major Walter G. Kilner, commanding officer of Camp Nichols, and by Lieut. George W. Goddard, Air Corps, who was in charge of the Air Corps exhibits at the carnival to pay a visit to that Air Corps post.

Another strange airplane passenger, who was also the first of his race to fly, is Chief Two Guns White Calf of the Glacier National Park Indian Reservation, who in 1912 was the first Indian ever to dare an airplane flight.

Because of his pioneer flight, the chief was recently called upon to ask the blessing of the Great Spirit on a modern plane just before its initial transcontinental flight.

WEATHER REPORTS AT NAVAL STATION

WEATHER reports from forty stations between San Francisco and San Diego are received seven times each day by the Naval Air Station at San Diego, Calif. This station is now connected with the Guggenheim model airway.

Each station sends in the direction and velocity of the surface wind, state of weather, cloudiness, amount and form, ceiling in feet, visibility, temperature, barometrical observations, and any remarks pertaining to gustiness, fog, or flying conditions. The forty stations making up this Guggenheim Airway are scattered along the coast and through inland valleys at the most strategic points to allow the best or most favorable routes to be chosen by the aviator.

CALIFORNIA AIR NEWS

JOE LEWIS, of Long Beach and Los Angeles, is now distributor for the Arrow Sport, in the southern third of California.

A NEW ground school building has just been completed on the Los Angeles field of the Aero Corporation of California and an extensive ground course was begun by this company on April 22, covering theory of flight, aircraft engines, airplanes, air commerce regulations, navigation and meteorology.

The school building is of Spanish Mission architecture to conform with other buildings on the field and contains two offices, student locker rooms, and a large class room. Cutaway motors, uncovered airplane parts, and a Baloptican machine are being installed.

THE third anniversary of the Salt Lake City-Los Angeles air mail route was celebrated in Los Angeles recently by chambers of commerce, service clubs, and business men. Since the establishing of the air mail line, Southern California has become perhaps the heaviest user of air mail of any similar section in the world.

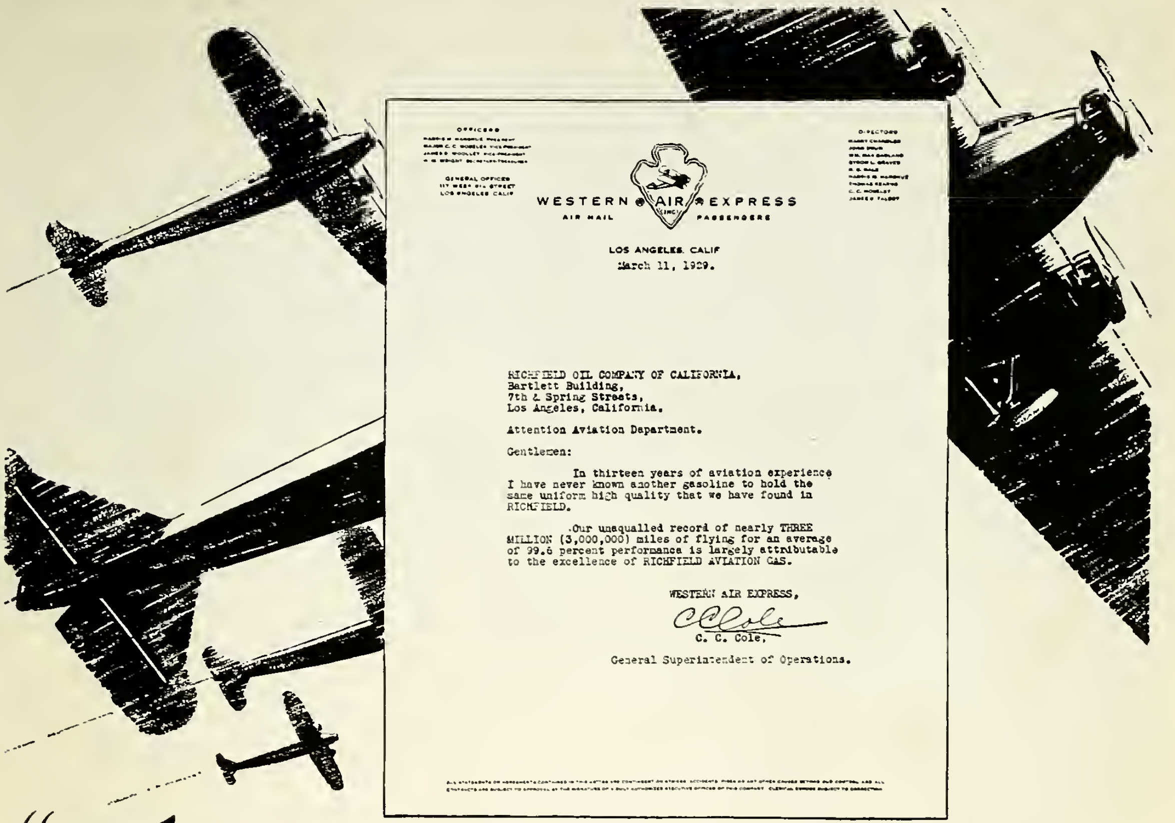
WESTERN AIR EXPRESS will erect a new service hangar at its Los Angeles terminal to care for planes of its lines. The building will be hexagon in shape, with a diameter of 286 feet, containing 53,498 square feet of floor space, and will have six doors, each 126 feet in width. It will be built of steel and concrete, and a great part of the exterior walls will be of glass. The interior steel will be aluminum painted further to enhance the light. It will be possible to service six airplanes, each with a wing span of 100 feet, at the same time. The stock and locker rooms will be located in the center. Above them will be the superintendent's office. Eaves Construction Company has the contract for the building.

NOWHERE in America has aviation in all of its branches developed more than in Southern California, according to Arnolt T. Anderson of the research staff of the Security Trust and Savings Bank of Los Angeles, in an industrial summary of Los Angeles published recently by the bank.

(*Continued on next page*)

©*Great Northern R. R.*

Left: Capt. Wilson with some of the Sulus; center: the Sultan in flying togs; right: Chief Two Guns White Calf.



WESTERN AIR EXPRESS
AIR MAIL PASSENGERS

LOS ANGELES, CALIF
March 11, 1929.

RICHFIELD OIL COMPANY OF CALIFORNIA,
Bartlett Building,
7th & Spring Streets,
Los Angeles, California.

Attention Aviation Department.

Gentlemen:

In thirteen years of aviation experience I have never known another gasoline to hold the same uniform high quality that we have found in RICHFIELD.

Our unequalled record of nearly THREE MILLION (3,000,000) miles of flying for an average of 99.6 percent performance is largely attributable to the excellence of RICHFIELD AVIATION GAS.

WESTERN AIR EXPRESS,
CCCole
C. C. Cole,
General Superintendent of Operations.

"Three Million Miles *with* Richfield"

WESTERN AIR EXPRESS

WITH an average of 99.6% performance to its credit covering a total of 3,000,000 miles travelled, Western Air Express has established a record for passenger and mail transportation that is without parallel in the history of aviation.

In recognition of its outstanding record, this great Pacific Coast line was selected last year from among the world's leading air lines to operate the Model Passenger Carrying Air Line, sponsored by the Guggenheim Foundation for the Promotion of Aeronautics.

Since its inception Western Air Express has used Richfield gasoline exclusively and its tremendous success in the field of air transportation is a tribute to the motor fuel on whose dependability it has staked its reputation and the lives of its pilots.

RICHFIELD
The GASOLINE OF POWER

RICHFIELD

(California Air News Continued)

In analyzing aeronautical manufacturing activity in Southern California, the article gives brief sketches of the Douglas Aircraft Company, Lockheed Aircraft Company and the Kinner Airplane and Motor Company, together with the statistics of production. In reviewing commercial flying progress mention is made of Western Air Express, Pacific Air Transport, Maddux Air Lines and Standard Air Lines, all of which have established regular air services. Other chapters discuss the coördination of air and rail transport, the selection of airports, the training given by aviation schools and the investment aspects of the industry.

Kinner Service Stations

THE Kinner Airplane & Motor Corp. is starting a new service organization which will cover the entire country. Kinner parts and service are at present within a day's time of any part of the country. The main service depots, however, are being established at key points and will carry a large and complete supply of parts. There will be smaller depots at all the principal airports.

During the last eight months, Mr. L. Bowman, who heads the service organization, has traveled to every state in the Union, except Florida, having covered more than 8,000 miles and having visited 152 aircraft companies in developing this service program.

Besides Mr. Bowman, Paul Murray, Wm. Moffat, Lee Brusse, and Peter Wessel, all of whom are factory trained service men, are now in the field for this service work. In certain localities, the Kinner company will furnish its service men with planes for the delivery of parts.

THE Aircraft Finance Corporation of America was formed at Los Angeles recently to finance the purchase of finished planes by retailers and individual buyers. The new finance concern has a capitalization of $30,000.

The Aircraft Finance Corporation will function in the field of aviation as an acceptance corporation. Headquarters of the company will be in Los Angeles and branches will be established throughout the country in centers of aircraft production. A. O. Hunsaker is president of the new corporation; O. K. Hunsaker, secretary and treasurer; and Carroll L. Post, chairman of the board of directors.

PACIFIC Technical University, of San Diego, has recently compiled an aeronautical course covering airplane engines, airplane mechanics, aerology and navigation. It is being released through flying schools for the use of their students. The course is reported to be very successful, being used by a number of Pacific Coast organizations. It is designed for schools not having adequate ground school facilities.

THE Airtech Training School was formed recently to handle the instruction work of the San Diego Air Service at Lindbergh Field, the San Diego municipal airport. The Weems system of aerial navigation will be taught, and both day and night courses will be offered. H. C. Gatty and Commander Frank Rorschbach, U. S. N., retired, will have charge of aviation and navigation classes respectively. The San Diego Air Services will center its activities in the sale of Travel Air and Fairchild planes, Russell Lobe parachutes, and other accessories.

Floyd Bennett Aviation Post of American Legion

THE Floyd Bennett Aviation Post No. 333 of the American Legion was chartered recently in San Francisco as a result of the organizing activities of Dr. J. Paul de River, a physician of San Francisco. Membership in the post is limited to veterans who have been connected with aviation since the armistice.

The Floyd Bennett Post, which is the third Legion aviation post in the United States, plans to take a constructive interest in legislative and administrative matters, as well as to further the cause of commercial aviation. It is named in memory of Legionnaire Floyd Bennett, who was Commander Byrd's pilot on the North Pole flight, and who lost his life going to the rescue of the Irish-German trans-Atlantic fliers in April, 1928.

THE recent one-third reduction in rates, for a thirty-day period, on all lines of Western Air Express is expected to be a great stimulus in airplane travel. The "anniversary excursion rates," as they are termed by company officials because the third anniversary of Western Air Express was April 17, became effective on April 13.

CHAMBERS OF COMMERCE, service clubs, postmasters and many leading business firms throughout Southern California coöperated in plans for the observance of Air Mail Week—April 14 to 21—marking the third anniversary of the inauguration of air mail service in that section of the state. This service was begun by establishing on April 17, 1926, of an airplane line between Los Angeles and Salt Lake City, connecting at the Utah metropolis with the transcontinental air mail line.

TWO carloads of Kinner-engined American Eagle airplanes were ordered recently by the Associated Aircraft, Inc., Hollywood, for immediate delivery; one carload for Hollywood and one for Phoenix, Arizona.

These planes will be used for flying instruction in the Rankin System of Flying Instruction for which the Associated Aircraft, Inc., is the California and Arizona licensee.

JAMES HOULIHAN, INC., a Pacific Coast advertising agency, has established an aviation department in its offices at Seattle, Portland, Oakland, and Los Angeles, according to an announcement of James Houlihan, president. D. R. Lane, formerly head of the aviation division of the Pacific Coast News Service, will have charge of the aviation department.

ARIZONA AIR NEWS

By Harold G. Wilson

ON the morning of April 8, eighteen Army planes, temporarily stationed at Fort Huachuca, maneuvered over Douglas, Bisbee, Naco, Nogales and Tucson. An abrupt cessation of bomb dropping on both Naco, Sonora, and Naco, Arizona, followed the warning of the Government to Mexican fliers of both the rebel and federal ranks that any plane which crossed the international line would be instantly shot down.

APPROVAL has been given the tentative airport site at Tombstone, by Jack Frye, president of the Aero Corporation of California, which operates the Standard Airline planes over this territory.

ARIZONA pilots and planes have been prominent in air activities connected with the revolution in Mexico, particularly at Naco, which received national publicity when the lone federal plane was captured by rebels and the pilot, R. G. (Buzz) Morrison, was taken prisoner. Morrison is a former student of the University of Arizona, Tucson, and while there learned flying at the Mayse Air School. He was induced to fly the Travel Air out of Naco on observation trips. The fact that he had previously quit the Mexican army and that he had refused to drop bombs on the rebels served him in good stead after his capture and he was promptly released at Nogales, Ariz.

A JOINT aviation committee composed of Tempe and Mesa members has been named to develop an airport to be located between these two towns and to serve both. The committee is made up of four groups,—the Tempe Civic Club, Mesa District Chamber of Commerce and councils of both towns. A class C airport, to be municipally owned and supported on a 50-50 basis, has been proposed.

THE Ajo airport site has been cleared, and two 1,000-foot runways have been constructed, together with a concrete apron 20 by 30 feet. W. J. Beaton is chairman of the aviation field committee of the Ajo Chamber of Commerce.

THE flying field at Yuma is to be improved as a class A field, $25,000 having recently been voted for this purpose by citizens of that city. A like sum is being expended by the Government in the erection of a meteorological and radio station, which work will be completed by June 15. Complete weather data for fliers will be compiled at this field. Similar Government stations have already been installed at Tucson, which is also on the Model Army Airway.

MORE than 70 students are enrolled in the Aero Corporation of Arizona School of Aviation, Phoenix. Two instructors are kept busy at this field.

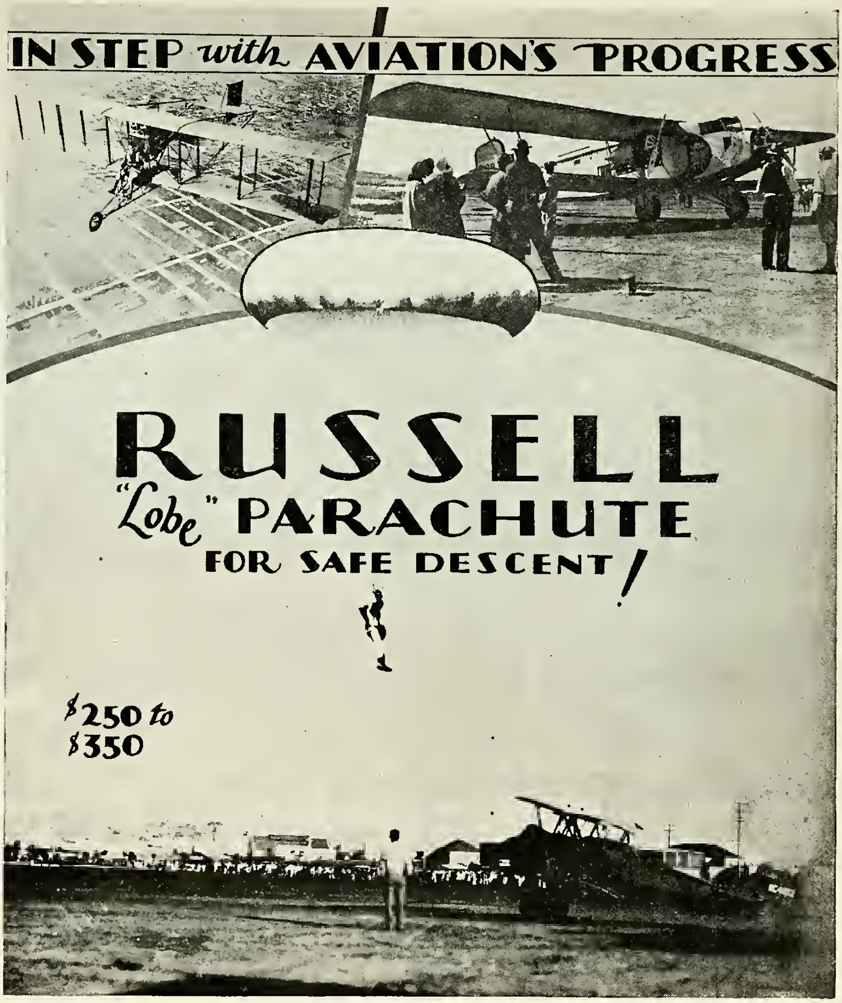
MODERN airport service stations, costing $8,000 each, are being established by the Richfield Oil Company along the route of the Standard Airlines, Inc., from

(Continued on next page)

RUSSELL *Lobe* PARACHUTE SALES & SERVICE AGENCIES

L. & H. Aircraft Co., 98 High St., Hartford, Conn.
Skyways, Inc., Copley Plaza Hotel, Boston, Mass.
Charlestown Aviation Service, Charlestown, R. I.
Northeastern Aircraft Corp., 360 Worthington St., Springfield, Mass.
Huntington Aircraft Corp., 1188 Main St., Bridgeport, Conn.
R. A. Gates, Granite State Flying School, Keane, N. H.
American Aircraft Corp., 3809 Angeles Mesa Drive, Los Angeles, Cal.
H. A. Hackett, 3140 Cndaho Street, Huntington Park, Calif.
J. L. O'Donnell, Municipal Airport, Long Beach, Calif.
Eddie Martin, Martin's Airport, Santa Ana, Calif.
Callies Flyers, 332 Garfield, Monterey Park, Calif.
Dowling & Morris, 662 No. Golden, Fullerton, Calif.
Ira B. Robers, Brawley, Calif.
Club Aereo Mexicali, Mexicali, B. C., Cal.
Cardiff & Peacock, Bakersfield, Cal.
Palo Alto School of Aviation, Palo Alto, Calif.
San Benito Flying School & Air Transport, Hollister, Calif.
Merced-Wawona Air Lines, Merced, Calif.
Paull & Smith, Salinas, Calif.
Garland E. Lincoln, 2110 San Jose, Alameda, Calif.
J. P. Sales, Petalnma, Calif.
Shasta Aircraft Co., Redding, Calif.
Wyoming Airways, Inc., Casper, Wyo.
Great Lakes Airways, Inc., 304 E. 3rd St., Jamestown, N. Y.
Spartan Aircraft Co., Inc., Tulsa, Okla.
Aero Corporation of Arizona, Phoenix, Ariz.
Cales Motor Co., Ralston, Okla.
San Diego Air Service, Inc., Lindbergh Field, San Diego, Calif.
Nicholas-Beazley Airplane Co., Inc., English at North St., Marshall, Mo.
A. G. Spalding & Bros., New York.
Western Auto Supply Co., 2004 W. Lake Ave., Seattle, Wash.; 1100 S. Grand, Los Angeles, Calif.; 2355 Broadway, Oakland, Calif.; 1560 Broadway, Denver, Colo.
Air Associates, Inc., Box No. 333, Garden City, N. Y.
Soo Skyways, Inc., Sioux Falls, South Dakota.
Pacific Parachute Service, Glendale, Calif.
Frederick H. Becker, 72 Murray Lane, Port Washington, Long Island, N. Y.
Aviation Schools, Inc., Seattle, Wash.
Parmenter Flying Service, Corvallis, Ore.
Willits & Co., 2 Pine St., San Francisco, Calif.
Pacific Airmotive Corp., 3417 Angeles Mesa Drive, Los Angeles, Cal.
Air City Airways, Air City Airport, Sturtevant, Wisc.
Knnihiro & Co., Ltd., Kobe, Japan.

Prospective Dealers—Write for Our Attractive Franchise Proposition



Passengers, students and famous flyers the world over are using this superior life-saving equipment. More than 10 lives were saved by Russell "Lobe" Parachutes in forced jumps during the past two years . . . a record of 100% efficiency in use!

This parachute is now furnished with lap, back or seat pack — and a comfortable, easily adjustable harness. No rubber bands, no springs, no pilot chute. In an emergency you simply pull the release ring—the parachute does the rest.

DESCRIPTIVE FOLDER ON REQUEST!

RUSSELL PARACHUTE CO

Manufacturers
1202 KETTNER BOULEVARD
SAN DIEGO CALIFORNIA

(Arizona Air News continued)

Los Angeles to El Paso. R. R. Petri, representative of the company, recently made an inspection trip to Phoenix, Tucson, Douglas and El Paso, where the stations are being constructed.

THE Aero Corporation of Arizona has been named sub-agent for the distribution of Travel Air planes in the Salt River Valley by the Southwest Air Service, Tucson, which holds the Arizona and New Mexico distributorship.

THE air depot at the International airport at Douglas has been completed and occupied by B. R. Russell, keeper of the lights and agent of the Standard Airlines. A reception room has been provided with a small ticket office in one corner. The water system has been completed at the port, as has the Richfield fueling station. No date has been set for the formal dedication of the field, which was indefinitely postponed because of the revolution.

AN airport is to be established by the Western Air Express at Kingman, in the northern part of the state.

THERE is still indecision in Gila County over two tentative airport sites, one of which is to be developed as a municipal field to serve Globe and Miami, twin mining cities. A Gila County aeronautical club has been formed with the following as directors: A. S. Floyd, Ben S. Wilson, Ben McNelly, Dr. Nelson D. Brayton, A. A. Nader and George Booth. Meantime plans and specifications for a field at Cutter to be known as the Glone Municipal Airport were sent to Washington for approval. Near Miami, a field is being developed at Burch and used as a base for commercial work by Sidney E. Ross, under the name of the Ross Airport. An alternate field is that at Midland City, which is being developed and used by Lieut. R. S. Vaughn, of Ontario, Calif.

The new factory building of the Axelson Machine Company.

STANDARD AIRLINES, INC., has moved its base at Phoenix, Ariz., from the municipal airport to the Phoenix Sky Harbor. The change was made because of the greater convenience of the latter field. A restaurant is planned for the immediate future, and concrete runways are now being built so as to eliminate the dust annoyance. A large hangar is now under construction, and the field is equipped for the servicing of planes. Schedules will not be affected by the change.

CHARLES L. GOLDTRAP, veteran Arizona pilot, has been named instructor of the Scenic Airways, Inc., school of aeronautics at the Phoenix Sky Harbor.

CONTACTS

By F. E. Samuels

ON a visiting trip through the southern section of California, I met nearly all of the leaders of the aviation industry south of Los Angeles. At the Long Beach Municipal Airport, our first stop, activities are at their highest peak. The instructors of the different flying schools are busy every hour of daylight. Three different airplane plants are getting on a production basis, and two experimental aircraft plants are about ready for trial flights of new planes. Improvements on the field are being made with clock-like regularity, and Long Beach should be congratulated in being the first city in California to provide and maintain a municipal airport.

OUR next stop was at the Crawford Airplane Manufacturing plant at Seal Beach, where they have just completed a new type three-place sport cabin plane that should be very popular, with its graceful lines, roomy cabin and good visibility.

INLAND a few miles, we came to Fullerton, with its municipal airport, run under the management of William Dowling and Willard Morris, two young men known well by the flying fraternity. Both are capable instructors, who have gained the confidence of a large clientele of students.

BACK again toward the ocean to Midway City, where the Zenith Aircraft Co. is located on its own field, we found the great Albatross undergoing a thorough overhaul and a number of minor alterations, including the installation of three new and larger engines, prior to another endurance flight trial.

AT Santa Ana our first stop was made at the Kinslow Machine Works, where Vitalite pistons are manufactured. A trip through the plant is always a pleasure, for this is one of the largest airplane piston manufacturing plants on the West Coast.

AT the Eddie Martin Airport, we were greeted by Eddie himself. Eddie has just purchased a Ryan Brougham and is now able to provide a cabin plane for the Santa Ana passengers in addition to his fleet of open planes. Business is top-notch with him, both passenger flights and student.

LEAVING Santa Ana, we made a hundred mile drive over a most delightful scenic highway along the ocean front to San Diego. Right on the highway, near town, is the T. Claude Ryan airport and flying school, where we were met by Mr. Ryan, who with his usual affable manner made us more than welcome. While at the field, two of the Maddux Airlines Fords landed, each with a full complement of passengers.

Mr. Ryan has bought out the Edginston interests, formerly known as the Mahoney Flying School, making the T. Claude Ryan Flying School one of the largest aeronautical training centers on the Pacific Coast. The entire equipment consists of sixteen planes of various types.

JUST a little farther we were at Lindbergh Field, San Diego's municipal airport, where the Pickwick Airlines have their San Diego terminal and the San Diego Air Service has its base of operations. The improvements made at this airport in the last few months are astonishing, a great share of which is due to the San Diego Air Service. Mr. Ray Campbell, formerly with the San Diego Chamber of Commerce and now general manager of the airport, and Mr. Wm. H. Bowlus, formerly production manager of the B. F. Mahoney Aircraft and now technical director and head of the ground school, are responsible for a great share of its success. The ground school is housed in a separate building and is fitted with everything for the students' comfort and convenience. The offices of the San Diego Air Service are large and cheerful, the hangars and shops are commodious, and the equipment is new and up-to-date.

THE Pacific Technical University is another San Diego aviation enterprise that is going ahead by leaps and bounds, and from all reports, the courses are giving entire satisfaction to a great number of students.

THE Prudden All Metal Airplane Co. has been taken over by a number of business men, who are experimenting on a new type of all-metal plane, the first of which will be ready for test flight about May 1st.

I AM sorry that Major H. A. Erickson, the flying photographer, was out of town while I was there, for it is always a pleasure to meet him, but his good wife informed me that his aerial mapping business is only restricted by human capacity to perform the work.

THE improvements made and the amount of business being done by the Russell Parachute Company furnished the outstanding surprise of the trip. Having taken larger quarters in the same building, this company is now employing over 50 persons. In the construction of Russell parachutes, the same efficient methods are used as in any other big production plant. The silk, cord, webbing and other parts of the chute start at one end of the big plant as material, passing

(Continued on next page)

From all parts of the world they come to
RYAN
RYAN at SAN DIEGO CALIFORNIA
CENTER OF THE WORLD'S GREATEST AVIATION ACTIVITY
Transport liners at RYAN AIRPORT
MADDUX AIR LINES
LEARN AVIATION with RYAN
Where Quality Training is Supreme!

America's Most Famous

AVIATION SCHOOL

Every section of the United States is represented at the T. C. Ryan Flying School. Men and women, everywhere, are realizing that the time and expense of coming to San Diego is more than repaid by the advantages of RYAN tutorage and the shorter time required for training under year 'round blue skies of California.

You, too, will appreciate the higher RYAN standards while training and the value of the RYAN SCHOOL reputation after graduation. RYAN training is *thorough* and includes the greatest possible variety of aeronautical experience. Equipment for advanced training includes eight different types of licensed monoplanes and biplanes, both open and closed, large and small.

RYAN students pilot their ships on cross-country trips over mountains, deserts and ocean; receiving the *complete* training which is possible only in the glorious state of California.

The daily ground school occupies four hourly periods each afternoon. Definite schedules of a well planned curriculum include the course in aerial navigation by Lt. W. V. Davis, U. S. N., member of the famous naval Sea Hawks and navigator for Art Goebel on his winning Dole Flight.

RYAN airport, as the hub for one of the country's largest air systems, also gives RYAN students daily contact with huge passenger planes arriving and departing on daily schedules. Aeronautical contacts are readily established here, for San Diego is the center of the world's greatest flying activity!

NOTE: *All training is given under the personal supervision of T. Claude Ryan, original designer and builder of Ryan monoplanes and founder of Ryan Airlines, Ryan Flying Company, T. C. Ryan Flying School and T. C. Ryan Aeronautical Corporation.*

This school invites the attention of those who are interested only in the highest standards of aeronautical training. RYAN TRAINING costs more than ordinary training . . . It is worth it! Courses include:

The Transport Course ....210 flying hours
The Commercial Course .... 60 flying hours also
The Private Course .... 20 flying hours

The Advanced Course for War-time Pilots and others who have had previous flight training.

Write to the T. C. Ryan Flying School at Ryan Airport, in San Diego, California, for illustrative catalog.

NAME.................................. ADDRESS.................................. AGE.............

(*Contacts continued*)

from one operator to another until they come out a complete parachute, packed in its holder and ready for service.

HAVING been so close to the border, we could not resist the temptation to visit Agua Caliente, Mexico, and we were well repaid for the trip. If there is a more beautiful resort anywhere, I should like to see it. Its architecture and surroundings are strictly Spanish. While we were there, two of the Maddux Airlines ships landed, left their passengers and took off on their regular runs with other passengers.

BACK in Los Angles, we found the Timm Aircraft Co. installing the first Curtiss Challenger engine on the West Coast in the latest Collegiate training plane. The boys inform me that they will build a large factory in the near future on a location to be announced later.

AT the Los Angeles Metropolitan Airport, a spring building program has been started which gives promise of setting a record. The Bach Aircraft Company has just completed the third unit of its plant to house the wood work department and is building an additional assembly unit, increasing the original floor space nearly seventy-five per cent. The Commercial Aircraft Company's factory has the steel frame erected, and completion of the building is expected within thirty days. This plant will start operations with one hundred employees.

The Standard Oil Company of California has let the building contract for a twenty-five-ship hangar of masonry and steel.

The Metropolitan Airport Company has also let a contract for its third hangar of twenty-five-plane capacity, work on which will start May 1st. This new hangar will contain offices, lockers and a clubroom for the operators and employees of the port, as well as a ladies' lounge.

WHILE at the Grand Central airport, I had the pleasure of meeting Jack Helm, who has taken over the California distributorship for the R. O. Bone Golden Eagle. Mr. Helm has taken hangar and showroom space at this port and is exhibiting a Golden Eagle that is drawing a lot of attention.

LIEUT. COLONEL R. S. HARTZ, chief instructor of the ground school course at Western College of Aeronautics, has been appointed dean of that institution. I have also been informed that Carl S. Clark, formerly business manager of the college, has been appointed general manager.

LESLIE MILLER, head of Miller Airplane Products, informs me that business was never better than it has been this spring. During the month of March, his receipts more than doubled those of any month in 1928, and the first ten days of April show even a greater gain.

EDWARD M. VERNON, junior meteorologist at the Oakland Municipal Airport, has been appointed director of the western division of the system of weather reporting stations of the Transcontinental Air Transport. Mr. Vernon has been with the Federal weather bureau service.

OAKLAND AIR NEWS

By HOWARD V. WALDORF

W. E. WILSON, president of the Comet Engine Corp., has announced the development of a Diesel type aircraft engine weighing one and one-half pounds per horsepower. Although few details of the Diesel type engine were announced by Wilson, he declared that the engine develops 300 horsepower at 1,600 revolutions per minute. A new type injection system is used, and the engine gives perfect performance at all speeds, Wilson said.

(*Editor's Note—No definite proof of the existence of such an engine was given by Wilson other than his word.*)

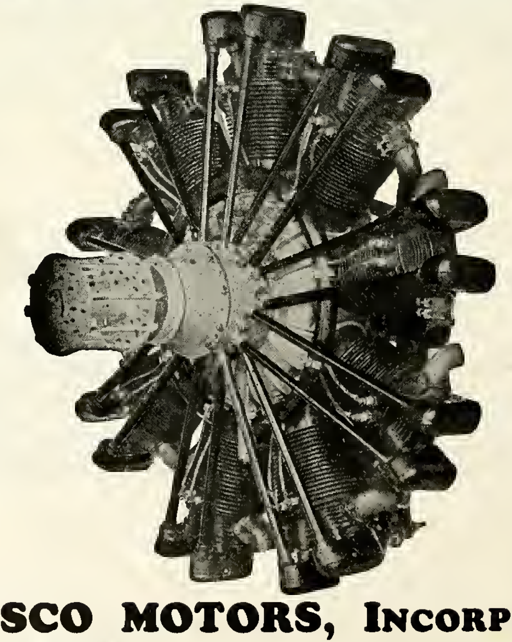
ON April 13, Mrs. Louise McPhetridge Thaden piloted her Hispano Travel Air biplane over the mile course at the Oakland Municipal Airport at an average speed of 156 miles an hour, claimed to be a world record for women fliers. During one dash over the course, the plane attained a speed of 165 miles per hour.

L. S. Nagle, president, and Henry Holtman, secretary of the Oakland chapter of the National Aeronautical Association, were official timers during the flights over the course.

RECOMMENDATION that a course in aeronautics be added to the curriculum of all high schools and junior colleges of California was voted unanimously by 1,000 delegates to the annual convention of public school principals, held in Oakland. An advisory committee of ten school principals

(*Continued on next page*)

MENASCO MOTORS



MODEL B 2

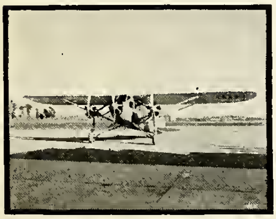
260 H. P.

MENASCO MOTORS, INCORPORATED
6178 McKINLEY AVENUE LOS ANGELES, CALIF.

Combining Every Feature the Modern Plane Should Have

The Kreutzer Tri-Motor Air Coach is safe and dependable. Three sturdy motors give it plenty of surplus power; chrome molybdenum steel tubing lends structural rigidity. A wide cruising range, short take off, and low landing speed make it independent of field locations.

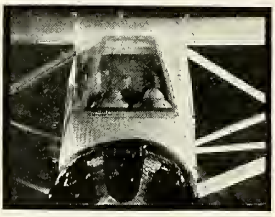
The Kreutzer Tri-Motor Air Coach is speedy. Its three motors hurtle it through the air at speeds from 100 to 130 miles per hour. Its ample power reserve gives it the ability to maintain its schedule in spite of head winds and unfavorable weather conditions.



The Kreutzer Tri-Motor Air Coach is fully equipped. Its instrument board has every aid for aerial navigation. Ventilators provide fresh air without draft. No detail has been omitted which might give greater assurance of safety and comfort.

The Kreutzer Tri-Motor Air Coach is comfortable. It is luxuriously fitted for six. Chairs have ample leg room; a small locker is located in the after panel in addition to the regular baggage compartment. Walls have a dead air space to reduce motor noises.

Visibility is excellent.



KREUTZER TRI-MOTOR AIR COACH

SIX PLACE . . . DUAL CONTROL . . . CABIN . . . MONOPLANE

JOSEPH KREUTZER CORPORATION

Executive Offices
1801 S. Hope St., Los Angeles

Factory 353 Third Avenue
Venice, California

(Oakland Air News Continued)

and aviation leaders was appointed to outline a course to be placed before the state board of education for approval. Recommendations of the convention aeronautic committee, headed by A. G. Paul of the Riverside Junior College, included the following provisions: (1) that the course be taught only by certified teachers in aeronautics; (2) that the instruction be given in adequately equipped shops; (3) that the course in high schools be limited to the eleventh and twelfth years only, (4) that the course in junior colleges be developed on the coöperative plan; and (5) that the department of aeronautics of the Army and Navy be asked to assist in outlining the course and in providing the necessary equipment.

WORK on the 37-room inn being constructed at the Oakland Municipal Airport is progressing rapidly, and the structure is expected to be completed about July 1. H. A. Speicher, manager of the airport restaurant, is to be in charge of the inn, which has been leased to the Interstate company.

DESIGNED as a social rendezvous for residents of Oakland and other cities of the Pacific Coast, an aero country club is being established at Olema, twenty-nine miles north of the Golden Gate. Known as the Wauhilla Country Club (Home of the Eagle), the facilities include a flying field with 2,500 and 3,000-foot runways, hangars, machine shops and service stations, as well as the usual country club features.

APPLICATION for a franchise for a speedboat service between Oakland Municipal Airport, downtown Oakland and San Francisco was filed recently with the state railroad commission by Capt. W. B. Voortmeyer, of Oakland. The service will cut the present travelling time by one-half, according to Capt. Voortmeyer.

AN impact recording machine has been designed by engineers of the Aeronautical Engineering Company of Oakland and San Francisco for use in testing airplane shock absorbers. The machine is set in concrete, and by means of two springs attached to pencils, records on tape the deflection of the springs and the time in fractions of a second.

EDWARD M. VERNON, junior meteorologist at the Oakland Municipal Airport, has been appointed director of the western division of the weather reporting service now being formed for Transcontinental Air Transport. W. H. Clover, also of the Oakland airport staff, has been appointed as an assistant in the western division headquarters at Los Angeles.

COMMERCIAL flying services now leasing office space in the hangars at the Oakland municipal airport include Wright Air Service, Sunset Flying Service, D. C. Warren, and Major Livingston Irving Aviation Activities.

WITH the installation of the 500-watt set formerly in the Concord station, pending the arrival of a 2500-watt set from the East, the Oakland airway radio station of the Department of Commerce is now in service. Preparations are being made to construct a radio beacon nearby. Norman W. Bliss of the Department of Commerce is in charge of construction.

THE inauguration of "de luxe air tours" of the bay region and the entire Pacific Coast was announced at the Oakland Municipal Airport by Lieut. Franklin Rose, general manager of the Metro Air Service.

Alameda Notes

By Howard V. Waldorf

SALE of 49 per cent of the stock of the Alameda Airport, Inc., to the Aviation Corporation, was followed by the launching of a filling program through which the landing area of the flying field will be trebled. Contracts have been signed with Army engineers for 200,000 cubic yards of silt now being dredged from the estuary. The filling will increase the landing area to approximately 200 acres.

A SIX day a week non-stop express service between Alameda Airport and Los Angeles was inaugurated April 1 by the Maddux Air Lines. Wasp-powered Ford monoplanes are used in the new service, which is in addition to the daily two-stop service via the San Joaquin Valley.

ALL COURSES
GUARANTEED

The California Aerial Transport absolutely guarantees all of its courses. When students take a course with this organization they are given a positive guarantee that they will accomplish the object of the course which they take, regardless of the amount of time required for its completion.

Instructions are given in the most modern equipment, by instructors who are veterans of the air, following a method of practical training that is unequaled anywhere.

LAWRENCE TALBOT
President & General Manager

All responsibility for any damage which might occur while ships are being handled by regular students is assumed by us, due to the superior method of instruction which has been adopted. There is no bond of any kind required, and no charges are made for damages from any one who is accepted for enrollment for one of the courses of this organization. This policy has been adopted after careful consideration and in fairness to our students, because we are positive that our method of practical training warrants such a course.

Our illustrated booklet will be a genuine revelation to anyone interested in aviation. Send for a copy today

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9800 PICO BOULEVARD LOS ANGELES, CALIFORNIA

Flight Facts from Lindbergh Field!

On Lindbergh Field you will find student flight schedules executed with express train exactness, training every day in Travel Air and Fairchild planes powered with Warner Scarab or Wright Whirlwind engines, instruction from Army and Navy trained Transport Pilots, and Russell "Lobe" Parachutes giving an extra factor of safety. These are some of the salient advantages of *Airtech* Training.

You will receive all of the interesting information about this advanced system of pilot training in "Flight Facts from Lindbergh Field," our new catalog. The coupon is for your convenience; mail it today.

AIRTECH TRAINING SCHOOL

Expansion of San Diego Air Service

LINDBERGH FIELD SAN DIEGO, CALIFORNIA

Please send me "Flight Facts from Lindbergh Field.

Name *Address*

SACRAMENTO AIR NEWS

By R. K. Clark

THIRTY-TWO Sacramento business men are charter members of the Sacramento chapter of the National Aeronautic Association which was organized recently. The officers are: R. U. St. John, president; Douglas H. Greeley, secretary; and R. S. Federspiel, treasurer. Directors include W. A. Hoskins, John W. Wells, F. Packard, Ingvald Fagerskog and J. W. Terrell.

SIX definite aeronautical projects to aid in the aviation development of Sacramento Valley were outlined recently to members of the High Twelve Club by R. E. Fisher, chairman of the statewide aviation committee of the California Development Association.

The aviation program of the association, as presented by Fisher, calls for:

Establishment of airports and landing fields in every county and all principal cities of California; publication of an airview map of California, presenting material on the state's geography, principal points of interest, data on aviation industry and airport facilities; assistance to all communities in proper markings as a guide to air pilots; sound expansion of airplane manufacturing industry; increased use of air travel; enactment of air legislation to stimulate travel and increase safety by making it unlawful for any person to operate a plane without a Federal license or fly any but a licensed plane; and coöperation of all aviation leaders for the greater development of air transportation and manufacturing through annual aeronautical conferences.

Members of the association aviation committee for the Sacramento Valley are: C. E. Wilkins, chairman; E. G. Funke and L. D. Packard, Sacramento; W. N. Woodson, Corning; Dr. J. P. Johnson, Yuba City; and E. S. Norby, Maysville.

MATHER FIELD was again the scene of flying activity when ten Army planes from Crissey Field, San Francisco, arrived here on April 15th for two weeks of bombing and machine gun practice.

LEO MOORE of Sacramento has accepted a position with the Galt High School as instructor of the ground school in the aviation department.

CHARLES F. SULLIVAN has been transferred to the municipal airport here as student instructor and chief pilot for the General Aeronautic Services.

DEPARTMENT OF COMMERCE records show that, on April 1st, California had 1,038 aircraft pilots licensed to fly by the Federal Government.

Registration of licensed pilots in some of the cities of the state was as follows: Los Angeles, 277; San Diego, 96; Oakland, 80; San Francisco, 75; Hollywood, 32; Berkeley, 26; Long Beach, 23; Riverside, 21; Bakersfield, 19; Alameda, 16; Sacramento, 12; Modesto, 9; Fresno, 8; San Leandro, 5; Piedmont, 5; San Jose, 5 and Palo Alto, 4.

PRELIMINARY study of the desirability of three of a dozen sites offered as locations for the proposed municipal airport is now under way by members of the city airport commission. The three proposed sites under consideration are held by their owners at $896,460, $803,000 and $730,000 respectively.

CALIFORNIA NOTES

By Russell Grigsby

Stockton

ON Arbor Day, the College of the Pacific held a celebration at its new field and christened the new Eaglerock training plane, *The Flying Bengal.*

Profs. Milton Lusk and C. L. White awarded prizes for flying to the following pilots—G. P. McCullum (Oakland Flying Club), Grant Anderson (Nevada Airways), Sidney DuBose, Jack Elliott (Oakland Airport), Bert Lane and Bill DeVries (Stockton Airport). Guy Turner, superintendent of Oakland Airport, was contest judge.

The runway at the Stockton Municipal Airport is being lengthened 700 feet and widened to 200 feet. It is being graded, rolled, and oiled. Two new approach strips to the runway are being added.

KENNETH ADAMS and Bert Lane have seven new students and Clayton Allen and Jack Knightengale have signed up five new students, among whom is Watkin Davies, aged 78.

RAY EPROSON and Fred Gomez recently tested their first product, a single-place sport biplane. They plan to start a 2-place monoplane soon.

MOORE AND GARDNER have sixteen students, and their pilot, Les Oranges, recently soloed six in two weeks.

Oakdale

OAKDALE has paid a deposit on an 80-acre field, one-half mile south of town. The field will be improved as soon as the title is clear.

Angels' Camp

CITIZENS of this famous old mining town have selected a landing field at Vallecite, 5 miles northeast of Angels' Camp, and are improving it.

Sanadreas

THE Calaveras Cement Co. is leveling a field down by the old Kentucky House, which is about the only spot around there where you could land all in one piece.

Modesto

MODESTO AIRPORT CORPORATION, which plans to build a privately owned airport near here, has filed articles of incorporation at Sacramento. Edward R. Hawke is president, and C. L. Seagraves, Jr., vice president.

The City Council decided to take steps to move the municipal airport to a more desirable location, and passed an ordinance limiting the field to licensed fliers only.

Tracy

BILL DeVRIES, Stockton pilot, has been appointed manager of Tracy's new airport.

On April 26-27-28 an Air Circus was to be held at Tracy. According to plans at the time we go to press, $1,000 were to be given away in cash prizes. Squadrons from March, Rockwell, Cressy and Oakland planned to be there.

The 160-acre field, four miles southeast from Tracy, has two hangars, one beacon, one wind pennant, gas, oil, and water pumps.

OREGON AIR NEWS

By C. K. Logan

DEDICATION of the Salem, Oregon, $50,000 municipal airport has been tentatively set for the state convention of the American Legion to be held August 8-10. Negotiations for the sale of state and privately owned land for the field is now under way.

THE Monocoupe agency held jointly by Lee Eyerly and Lee Inman of Salem as well as Inman's interest in a cabin monoplane designed by Eyerly, has been acquired by C. J. (Bud) Jensen, formerly of Kansas, who learned to fly at the Eyerly school last summer.

THE Hobi Airways of Eugene have announced the withdrawal from the organization of Major H. H. Eckerson, who has been succeeded by "Dinty" Moore of Seattle. Moore has been flying the air mail between Seattle and Victoria, B. C., and has been connected with the Seattle Airways and Northwest Air Service company.

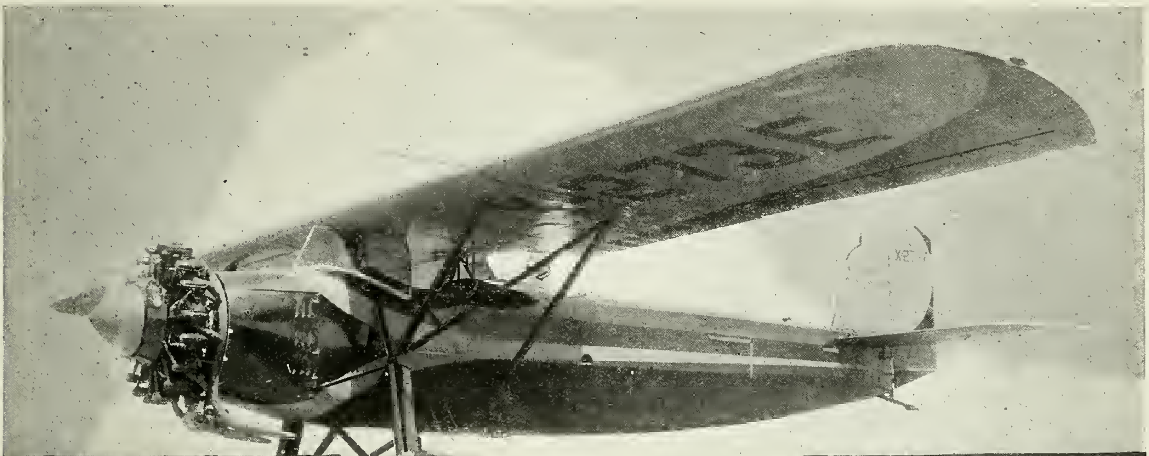
APRIL 15 was aviation day in Salem. Talks were given by Judge Brazier C. Small, chairman of the airport commission, and W. A. (Scout) Hazelwood, chief pilot for the Eyerly School. Others identified with local aviation were guests.

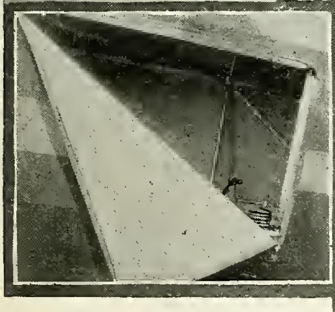
CONTRACTS have been signed by the Eyerly School of Aeronautics for the purchase of four Travel Air ships, delivery of the first to be made immediately and the others to be determined later as the type needed is decided upon. A survey looking towards a scheduled transportation line will be made in the near future. Purchase of the ships carries an exclusive agency for seven counties.

THE city council of Albany has approved the purchase of 135 acres on the Pacific highway near there for a municipal airport authorized under a $25,000 bond issue. Runways will be 2,700 feet long.

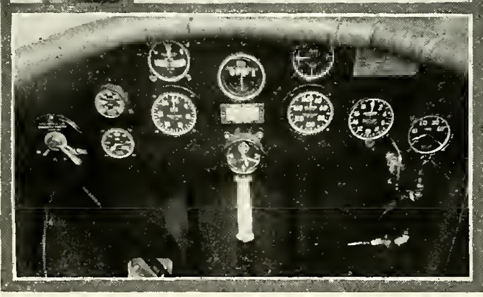
A CARLOAD of machinery and two ships have been received by the Breese Aircraft Corporation of Beaverton, and Nelson E. Jones, general manager, expects operations to start immediately. The company turns out Aloha planes similar to that flown by Martin Jensen on his flight to Honolulu last year.

(*Continued on next page*)





All of the chrome molybdenum tubing is oversize. Micarta pulleys are easily inspected.



Blind flying, under any condition, is easy for the man who flies a Moreland

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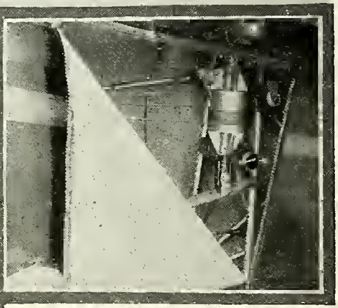

The husky stabilizer worm and the tail assembly are reached with the aid of "Zippers" too.

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MORELAND AIRCRAFT Inc.

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El Segundo, California

The new home of the Rankin School of Flying, Portland, Ore.

(Oregon Air News continued)

BECAUSE of the vast amount of mail during the fruit season, when more than 1,000 letters are despatched daily to eastern fruit centers, Medford will have a night air mail service beginning June 1. Mail will leave the airport at 1 a. m.

PURCHASE of additional equipment for his school is contemplated by Alfred Adams, Silverton, who has several business men as students. He is a former student of the Eyerly School of Aeronautics at Salem and the Rankin Flying School of Portland.

NORTHWEST AIR NEWS

By F. K. Haskell

THE Washington Aircraft and Transport Company has been formed by A. Elliott Merrill, Gilbert Cook and Omar C. Drury. The company will operate from Boeing Field, Seattle, and will engage in aerial photography, conduct an aviation school and represent several eastern airplane and accessory manufacturers.

THE Mamer Flying Service, after a most successful season in 1928, will inaugurate a passenger and express airplane service between Portland and Spokane. Two planes, that will accommodate eight passengers each, will make the trip in two hours and 45 minutes.

TEX RANKIN FLYING SERVICE, INC., is now housed in a modern school. The various departments are all under one roof and each department is in charge of experts. Plenty of light and space are features of the new flying home, including offices, classrooms, supply rooms, battery and welding departments and assembling room. Negotiations are now under way to have a Pratt & Whitney engine put in the school for student purposes.

More than three hundred and twenty-five flying pupils are now enrolled in Rankin Flying Service, Inc., which includes those in class work, ground work and advanced flying and solo. The minimum flying course is now 20 hours instead of ten hours.

Among the instructors is Lieut. H. W. Smith, in charge of the ground school and class work. Ray Bartley is motor instructor, and Dan Grecco is instructor in rigging and welding, which latter department is becoming more important with the new methods employed.

Among students who have recently finished the 50-hour course are Carl Gill and Kenneth Dewar of Trail, B. C., and Eric Gunner of London. In order to study the various airports after completing their flying course, they were taken by Tex Rankin in a Ryan south as far as Los Angeles, stops having been made at well-known fields at Eugene, Medford, Corning and Oakland.

THE field at Pasco, Wash., is being enlarged to take care of the largest planes, and the entire surface is being oiled.

DURING his recent trip through the State of Washington Tex Rankin visited the Yakima field. McAllister Flying Service, Wickstrom Flying Service and the Western Air Lines will erect a modern hangar there in the near future.

WALLA WALLA'S second annual air derby will be held May 24th to 26th. The new municipal airport will be dedicated on this occasion.

MEDFORD, ORE., has voted by an overwhelming majority for a $120,000 bond issue for establishment of a Class A airport. Work will be started at once on a 5,000-foot runway to be completed early in June.

WITH the survey work completed, P. T. McCarty, president of International Airways, announces that a passenger service will be started from Seattle to British Columbia and Alaska, operating eight-passenger planes.

USING the new lights set up on the Swan Island airport, the first night student flying has been started by Rankin Aviation School.

Three students who have already been doing night flying are B. K. Bucy, T. W. McDonald and W. A. Dazy. Rankin instructors will continue the night instruction, which has been made possible by the huge lights installed by Port of Portland commissioners.

AT the regular meeting of the Aero Club of Oregon, airplane manufacturing in Oregon was discussed at some length. The chairman of the meeting was Charles V. Eakin, president of the West Coast Air Transport. Others who gave interesting addresses were J. Kegerreis, Aircraft Builders, Inc., Nelson E. Jones, general manager of Breeze Aircraft Corporation; Lee Eyerly, Eyerly School of Flying, Salem; Roy Davis, and S. E. Woodford.

WASHINGTON AIR NEWS

By C. M. Litteljohn

RIGNEY FARM, nine miles south of Tacoma, is the scene of operations for the development of an airport for that city. About 640 acres are embraced in the tract, upon which condemnation proceedings are under way to take title for an airport that will stimulate flying in and about Tacoma.

THE Western Aero Corporation was formed and incorporated at Seattle recently. Incorporators are A. H. Zieglitz, J. A. Kinnear and H. L. Stark of Seattle.

AN auxiliary airport for seaplane landings is to be developed near Tacoma. The commissioners recently agreed to accept a donation of 200 acres of land which adjoins Spanaway Lake, a mile and a half east of the city.

THE Northwest Air Service, Inc., is a newly formed Seattle organization, headed by John R. Blum, U. S. Navy Reserve. Renton airport facilities for land and water landings will be used, inasmuch as several land and seaplanes are operated for the student school. The corporation also has inaugurated a number of scenic tours.

AIR TOURS, INC., is a new Seattle corporation, of which J. P. Livermore, H. B. Crisler, C. E. Howell and D. M. Beard are the incorporators.

THE Mamer Air Transport, is a new Spokane corporation. Incorporators are Clarence K. Paulsen, N. B. Mamer and Newton Wakefield.

THE Northwest Aircraft and Motor Corporation was recently formed and incorporated at Seattle, with capitalization of $50,000. Incorporators are R. R. Bell, C. M. Dickison, Clifford Limpright, and L. F Duvall.

A MUNICIPAL hangar to cost about $50,000 is planned as one of the major improvements for the municipal airport at Spokane. The committee of the city council recommended this hangar be constructed of brick and concrete, 200 feet by 125 feet. New lighting systems were also recommended.

SAND POINT FIELD at Seattle, which is the naval air station north of the city, will undergo many improvements, according to recent plans. More than a million dollars has already been authorized for immediate expenditure. More land is being required for additional space, and condemnation proceedings are to be taken against this property in the near future.

A FLYING survey of the Pacific coast from Puget Sound to southeastern Alaska has been made by the Boeing System, preparatory to a regular passenger service between these points, according to an announcement of Boeing officials. Boe-

(Continued on next page)

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Miller Reamer Sets, etc., are indispensable when grinding valves.

We also sell numerous other necessities, including the German Bosch Magneto, Bosch Spark Plugs, Bosch Ignition Cable, and last but not least the Bosch Breaker Assembly to fit Berling Magnetos.

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The **5** *patented features in*

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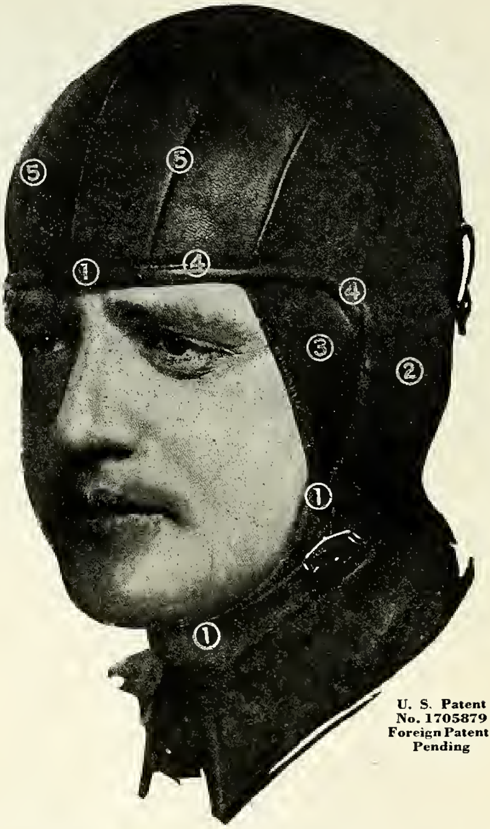

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1 Showing the snug, tailored fit around the forehead and face and under the chin.

2 A "cupped" effect, which can never be pulled out of shape, provides a comfortable place for the ears.

3 These "windwings," with their elastic edge, will protect the face against the toughest gale.

4 This special method of binding puts the strain exerted by the pull on the chin-strap only on the outer edges of the helmet, thus assuring always a windtite fit.

5 A reinforcement feature which stops, at last, that annoying wind-flutter on top of the head.

Altogether, the Scully Helmet is a product of unusually fine workmanship, primarily designed to render superlative service.

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(*Washington Air News Continued*)

ing flying boats powered by Pratt and Whitney Wasp engines will be used on the new route. The planes, which are a redesign of the B-1 seaplane, will carry six passengers. The route will follow the protected waters of the inside passage.

W. A. PATTERSON was recently appointed general traffic manager of the Boeing System, according to an announcement by P. G. Johnson, president of the Boeing companies. Patterson will supervise the traffic promotion work for the Boeing Air Transport, which operates between San Francisco, Oakland and Chicago, and the Pacific Air Transport, between Los Angeles and Seattle. Both lines transport air mail, express and passengers, and daily mileage ranges from 7,000 to 10,000 miles. General traffic headquarters of the Boeing System will be maintained at Salt Lake City, which is also the operating headquarters of Boeing Air Transport.

AN extensive building program will be started by the Boeing Airplane Company with an expenditure of approximately $250,000 for an administration building, ground improvements and a large hangar at Boeing Field, Seattle, Wash.

AVIATION Operators Association of Seattle started on a tour of Washington state on April 18 to promote greater interest in aviation and airport development. The tour will require 36 days and will visit 26 cities and towns of the state.

A. J. KINSMAN was recently appointed passenger traffic manager of the Boeing System with offices in Salt Lake City. Mr. Kinsman will supervise the passenger solicitation work for both Boeing Air Transport and Pacific Air Transport.

E. T. ALLEN, Boeing mail plane pilot, recently saved three hours in the delivery of mail by the use of the radiophone when forced to land by minor engine trouble. When the trouble began on his trip from Reno to Oakland, he phoned ahead for an emergency plane to meet him at the intermediate landing field.

RUSSELL AHRENS and K. K. Knickerbocker were recently appointed traffic representatives of the Boeing System at Oakland and Portland respectively.

BOEING SYSTEM now owns and operates forty-five planes and has forty-four pilots.

A SURVEY was recently made by the Boeing System to determine what, if any, prejudices exists among business men against using airplanes. Of the 1,400 men questioned, 1,152 said that they would use plane service in an emergency, and 980 explained that the reason they had never used air transportation was that an opportunity had never presented itself. Only 26 said that they were not interested in air travel.

Portland-Seattle Route

PACIFIC Air Transport will soon begin an air passenger service between Portland, Tacoma, and Seattle, using a four-passenger plane on daily round trips. The distance between Portland and Seattle is 153 miles. Pacific Air Transport is a unit of the Boeing System.

COLORADO AIR NEWS

By Robert C. Cleminson

A NUMBER of ships attended the recent opening and dedication of the airport at Otis, Colorado. Approximately 6,000 pieces of air mail were carried to Denver by Capt. Goss in his Stearman mail plane. The airport is an 80-acre tract of land about a mile north of Otis.

AVIATION COLLEGES, INC., has been formed by Mr. David A. Malvern, of Denver. He offers a home study course in conjunction with actual air work in his planes at the Commercial Airport. He will also operate a passenger carrying service.

PLANS have been completed for the Gardner Trophy air race from Denver to St. Louis. The take-off will be from Lowry Field on May 28th. The Alexander Aircraft Corporation of Colorado Springs offers a complete service on ships before the race.

(*Continued on next page*)

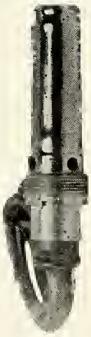
Telegram: *Among other Thermo Pete successes at the Detroit Show was an order from Mono-Aircraft, Inc., for enough "Thermo Petes" to factory-equip every Mono Coach from now on. So here's another big bunch of flyers who will save 85 per cent of warm-up time and trouble. As soon as all skybirds have heard of "Thermo Pete," a ship flown without "Thermo Pete" will be as rare as a dodo.*

"Thermo-Pete" Saves 85% of Warm-up Time!

Start "Upstairs" with the first few turns of the "Prop"!

NO longer any need to spend 20 to 60 minutes warming up the cold oil in a colder motor! No more need for removing oil and heating it by hazardous methods! No more need to waste valuable time, valuable fuel, or quickly wear out an expensive airplane motor!

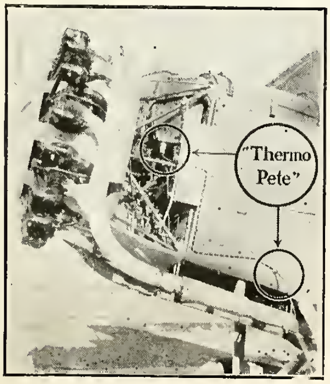
"Thermo-Pete" (best friend to motor and pilot) when connected with the ordinary 110-volt lighting circuit, quietly, quickly and inexpensively heats the oil (without injury) to the desired take-off temperature, ready for "Contact" and "Twist the Stick" and "She's Away!"



Flyers are doing this every day with "Thermo-Pete"

Approved by National Board of Fire Underwriters and many other authorities, "Thermo-Pete" is today's scientific answer to the need for saving Dollars, Pilot's Time, Motor Depreciation, Schedule Hours and Hangar Labor.

Use coupon and let us airmail you complete details of the help "Thermo-Pete" will be to the motor of YOUR ship.



"Thermo-Pete," patented Sept. 27, 1927 (with other patents pending) has been approved by the National Board of Fire Underwriters and many other authorities.

Flyers all over the U. S. are enthusiastic about this device. YOU need "Thermo-Pete."

Aviation Accessories Corporation
Balfour Building *San Francisco*

I am flying a ....ship
with ....motor
whose oil tank holds......................gals; is made
of..............................and whose
shape is like the rough sketch I've drawn in the margin.
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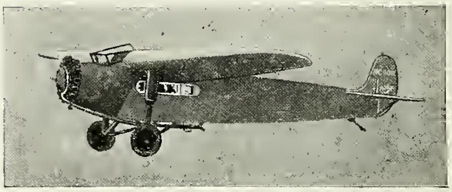

The Fokker Universal, powered with a Wright J-6 300 h.p. engine.

EXECUTIVES find that woven in the name Fokker is the comforting knowledge that every detail of airplane construction has been met as soundly as modern research, trained specialists, and finest materials can provide.

Engines—appointments—balance—strength—all are found in perfection in Fokker aircraft.

Perhaps the finest model for commercial purposes is the Fokker Universal pictured above. It is specially designed for business men, having adequate facilities to transport six passengers luxuriously. Dual control and double pilot cockpit.

A complete flying school is maintained by the Aero Corporation of California. This company operates the Standard Airlines, "the pioneer line," from Los Angeles to El Paso, via Phoenix, Tucson, and Douglas.

AERO CORPORATION OF CALIFORNIA, Inc.
9401 South Western Avenue—Los Angeles
Distributors in California and Arizona for Fokker and Alexander Eaglerock aircraft.

(Colorado Air News continued)

A FIVE MILLION candlepower stationary beacon was recently installed in the tower of the Daniels and Fishers department store at Denver. The new beacon points in the direction of the leading airports of the city. There is also a rotating beacon in the tower.

THE Mile High Flying Club of Denver has been adding a great many new members. Paul B. Lanius is president of the club, and Stanley Ferguson is secretary. Capt. Ralph J. Hall is instructor.

LIEUT. NEIL T. McMILLAN is now instructor for the Colorado Airways flying school at Denver.

SEVERAL changes in the personnel of the Western Air Express have recently been made. Capt. Lewis W. Goss is division superintendent; M. O. Bowen and Royal Leonard are the pilots; Dave Hissong is reserve pilot and mechanic; and Leslie Frazier is chief mechanic.

ALEXANDER AIRCRAFT COMPANY is designing three models of the newly announced Eaglerock Bullet. The 22 Bullet is the small, 2-place cabin monoplane seating two people. It is a sport and training plane of the convertible coupe or cabriolet type. The 32 Bullet which carries four people is powered with engines of from 100 to 150 horsepower. The 45 Bullet is designed for heavier duty, and is powered with engines of 225 or more horsepower.

BECAUSE of the number of college students participating in the Alexander competition, both a scholarship in the Daniel Guggenheim School of Aeronautics and an Eaglerock airplane will be awarded to winners, according to a recent decision of officials of the Alexander Aircraft Company. Formerly the winner was to have his choice of the scholarship or plane. Contestants will have to state for which award they are competing.

UTAH AIR NEWS

By Glen Perrins

SPRING work on the entire Salt Lake field of 300 acres is well under way. Installation of a mile and a half of drain tile will commence in the near future, and a long drain to points in front of hangars will be arranged to keep the airport in best shape.

H. M. HIGHTMAN, assistant meteorologist under J. Cecil Alter, chief of the local weather bureau, has taken over the observation station at Salt Lake airport. He will have three assistants and will operate on a twenty-four-hour basis.

BILLS licensing aircraft and fliers have been approved by the lower legislative house. One of the aircraft bills, sponsored by Representative George Critchlow, makes the Utah rules governing the licensing of airplanes and fliers coincide with Federal regulations.

SCHEDULED sightseeing trips over Salt Lake and passenger air service to southern Utah parks, has been announced by the management of the newly incorporated Seagull Airlines. The company has also announced that it has taken over the Salt Lake School of Aviation and will operate it as one of its subsidiaries. Serge F. Ballif is president.

GENERAL traffic headquarters of the Boeing Air Transport, Inc., will be moved to Salt Lake City from San Francisco, according to report from Philip G. Johnson, president, of Seattle.

A PROPOSAL for extension of the Salt Lake-Great Falls air mail route northward to Calgary, Alberta, and possibly on to Edmonton, Canada, is under consideration, according to the National Parks Airways, operators of the present route. If the new route is approved, passengers will be carried, as well as mail.

THE Union Pacific Airways, Inc., has filed articles of incorporation at Ogden. Dean R. Brimhall is president and R. H. Hinckley, vice-president.

ALTHOUGH specific dates are unannounced, it is definitely known that airplane passenger service employing twenty-passenger planes will be inaugurated in Idaho by the Varney air mail service with the coming of summer. The route followed

(Continued on next page)

SAFETY AIRCRAFT TIMM 1911

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Hisso, 300 H. P., good, used	**$295.00**
OX5 pistons, Hi-compression	**$4.75**
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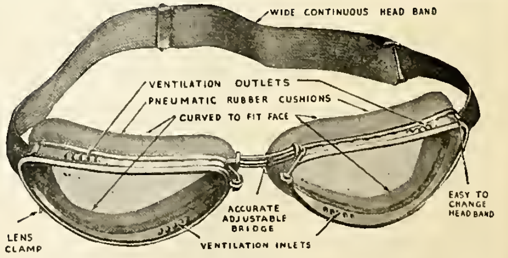

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If your dealer cannot supply you, write

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METROPOLITAN AIRPORT

An increase of 176% in the operations at this airport is shown for the first three months of this year.

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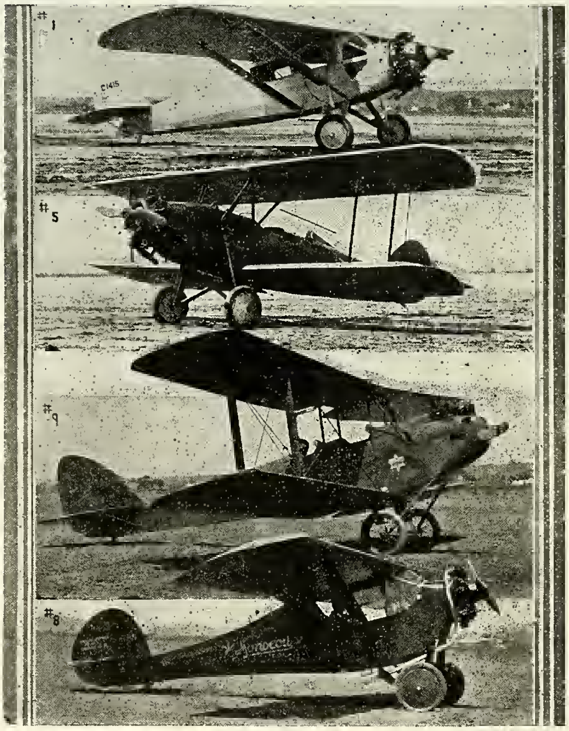

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No. 4. Waco 10—OX5 motor. Just recovered, factory job, like new. Worth $2900. Sale price........	**$2443**
No. 5. Waco 10—Siemens & Halske 7-cyl. motor. Factory recovered, and motor new. Whole ship as good as new. Worth $5,000. Sale price............	**$3990**
No. 6. Ryan M2—Wright E2, 200 H.P. motor. Good condition. Worth $4,000. Sacrifice price...........	**$2990**
No. 7. Ryan M2—Hispano Suiza, 150 H.P. motor. Plane in excellent condition. Worth $3500. Sale price	**$2612**
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(*Utah Air News continued*)

will be the same as that of the air mail and the ships will cover the schedule daily.

PLANS for a western states air commerce and airways conference next June in Boise, to promote and develop interstate airways, will be arranged in the near future, it is reported.

Calling of the conference is in line with the Idaho air commerce act, recently passed by the Idaho legislature.

THE problems of air transportation will be included in the program of the American Society of Mechanical Engineers at its semi-annual meeting in Salt Lake City in July.

IDAHO AIR NEWS

By Ida M. Durnin

THE signing by the governor of the appropriation bill passed by the Idaho legislature makes available $25,000 to the commissioner of public works for surveying and constructing air navigation facilities.

GEORGE C. MILLER, airway extension superintendent of the Department of Commerce, has been assigned to Idaho to assist in mapping out the state's airway program. Mr. Miller laid out the lighting system for the Salt Lake-Los Angeles and Salt Lake-San Francisco routes and was working on lighting between Portland and Pasco when assigned to Idaho. He will assist the departments of public works and law enforcement to map out their aviation program along the lines of legislation passed by the 1929 session of legislature.

CONSTRUCTION on Nampa's new airport was begun recently with the sanding of two 2,900-foot runways. Two other runways are planned, as is also a beacon light for the guidance of night fliers.

A NEW air mail speed record between Salt Lake City and Boise was established recently when Paul Andert, Varney line pilot, negotiated the distance in one hour and forty minutes. The distance by airline is 315 miles.

HONOLULU AIR NEWS

By Verne Hinkley

THERE has been no end of argument in the legislature of late over the amount of money which is to be provided for the use of the territorial aeronautical commission which will begin its two-year term of activity on July 1. Commission officers assert that they require funds to develop fields which will accommodate landplane and amphibians before they will require money to build seaplane harbors. Others are of the opinion that the contrary is the case, basing their contention on the fact that the Inter-Island Airways, Ltd., just incorporated, is expecting to employ amphibians in its service, these amphibians to use the existing ship harbors on the various islands.

Slightly in excess of $360,000 is being asked for expansion, in addition to $100,000 for commission expenses and administrative phases.

TWO Honolulu youths have left to enter the Army primary training school at March Field. They are Theodore R. Walters, who was a second lieutenant in the 298th Infantry, Hawaii National Guard, and Private Horace S. Williamson, of the 23rd Bombardment Squadron at Luke Field.

STANLEY C. KENNEDY, president and manager of the newly incorporated Inter-Island Airways, Ltd., has sailed for the mainland. He expects to visit the Sikorsky factory on Long Island and may place orders for ships there. He also will look for an operating manager for the line while on the mainland. During the World War, Mr. Kennedy was a naval aviator.

AIR conditions in Hawaii seem to create a natural laboratory for the training of pilots, according to an article appearing in the Army and Navy news section of a Honolulu paper recently. Officers of the Army here and in Washington, the story said, consider the island of Oahu one of the best "finishing schools" in the world.

TWENTY-FIVE Army aircraft took part in the welcome extended to Colonel H. L. Stimson, secretary of state in the Hoover cabinet.

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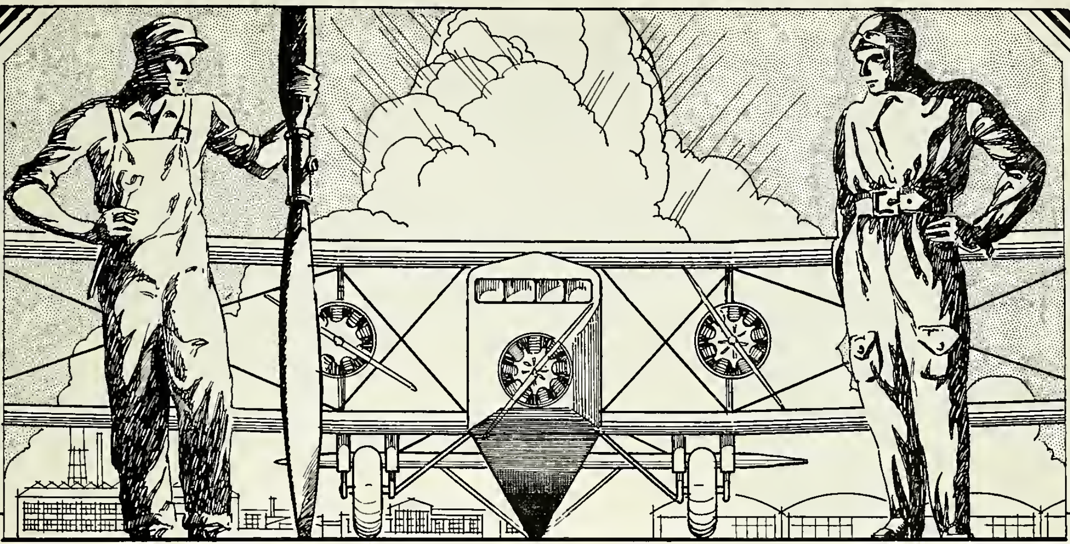

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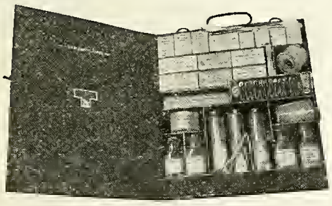

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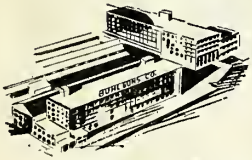

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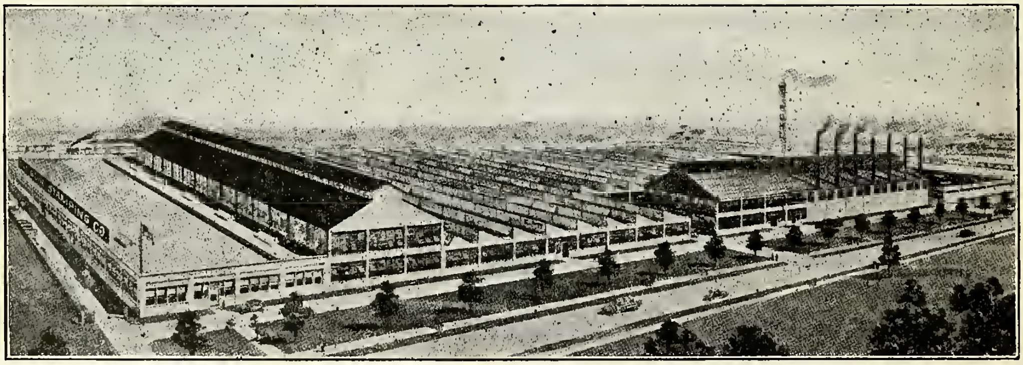

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AERONAUTICAL INDUSTRY

UNITED AIRCRAFT CO. ACQUIRES STOUT LINES

THE United Aircraft and Transport Corporation has announced that it has acquired the Stout Airlines, Inc., one of the principal airplane passenger carrying concerns now operating in the Middle West. The acquisition of the Stout company is a further step in the plans of the United Aircraft and Transport Corporation to develop a transcontinental passenger air service connecting the Atlantic and Pacific coasts and utilizing the Boeing Air Transport, Inc., whose operations extend at present from Chicago to San Francisco.

F. B. Rentschler, president of United Aircraft and Transport, also announced that the Boeing Airplane Company has informed him of the incorporation in the near future of Boeing Aircraft of Canada, Limited, which will acquire all of the assets and business of the Hoffar Beeching Shipyards of Vancouver, B. C. Flying boats and airplanes would be manufactured by the Canadian company.

For the last two years the Stout Airlines have maintained passenger transportation on regular schedules between Detroit and Cleveland, and since last November between Detroit and Chicago.

Last year, on the Detroit-Cleveland line and during two months of operation between Detroit and Chicago, Stout Airlines carried 46,563 passengers. During 1927 the mileage flown amounted to 127,943 miles, whereas 251,164 miles were flown in 1928. No passenger has ever been injured on any of the company's flights.

"In connection with future operations we desire to announce that the officers and personnel of the Stout company who are responsible for the great success of the company will be retained," Mr. Rentschler said.

The Stout company was developed by William B. Stout, president of Stout Airlines, who also is chief of the airplane manufacturing division of the Ford Motor Company.

The United Aircraft and Transport Corporation is a holding company which comprises, in addition to the newly acquired Stout lines, the Pratt & Whitney Aircraft Company of Hartford, Connecticut, manufacturers of Wasp and Hornet engines, the Boeing Airplane Company, the Pacific Air Transport Company, the Boeing Air Transport Company of Seattle, the Hamilton Metalplane Company and the Hamilton Aero Manufacturing Company of Milwaukee, and the Chance Vought Corporation of Long Island City, New York.

NATIONAL ELIMINATION BALLOON RACES

THE National Elimination Balloon Races will be held at the Pittsburgh Stadium, Pittsburgh, May 2 to 4. In addition to the races there will be airplane displays, pyrotechnic demonstrations, parachute jumping, and other entertaining novelties. The National Elimination races are sponsored by the National Aeronautic Association, and sanctioned by the Aeronautical Chamber of Commerce.

EIELSON RECEIVES HARMON TROPHY

CARL B. EIELSON was awarded the Harmon Trophy recently by President Hoover for his piloting of Capt. Sir George Hubert Wilkins across the Polar regions from Point Barrow, Alaska, to Spitzbergen. The Harmon Trophy is awarded annually for outstanding feats of aviation. It was established three years ago by Clifford Harmon, now president of the International League of Aviators.

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President Hoover presenting Harmon Trophy to Carl B. Eielson. Assistant Secretary William P. MacCracken, Jr., right, and Major Clarence Young, center.

REGULATIONS FOR FLYING SCHOOL RATINGS

MINIMUM training courses, classification of schools, and adequate training equipment, are the provisions of the draft of regulations made by the Aeronautics Branch of the Department of Commerce for the rating of civilian flying schools throughout the country, and recently approved by Assistant Secretary William P. MacCracken, Jr. The rating standard will permit students of approved schools to include in the total hours required for licenses the check time spent in piloting planes under supervised instruction, provided application for a license is made within thirty days after graduation. The new regulations lay down requirements as to courses and personnel of schools, and their requirements in planes and shops. They limit the number of students instructed on each plane and the number of planes operated from each school field.

Three classes of flying and ground schools are designated—private, limited commercial, and transport. All students shall be given instruction in stalls and spins prior to the first solo. Students of private flying schools are required to receive a minimum of eighteen hours flying time, of which ten hours shall be dual instruction, and eight hours solo flying. Limited commercial schools are required to give students a minimum of fifty hours flying time, of which fifteen to twenty-five hours must be dual. Transport flying schools are required to give students a minimum of 200 hours flying time, of which from thirty-five to fifty hours must be dual. The regulations permit this check time to be counted on the requirements for limited commercial and transport pilots' licenses.

Students in limited commercial flying schools are required to have two hours solo experience in flying two other planes than the one required for instruction, one of which shall be of the cabin type. The maximum period of instruction is six months. Students of the transport flying schools are required to have ten hours solo experience on two other types of planes than the one on which primary dual instruction is given, in addition to ten hours solo experience on a four-place cabin plane, or plane of a larger type, and ten hours experience in night flying. Maximum period of instruction for this class of school is eighteen months.

Private ground schools are required to give students a minimum of twenty-five hours instruction, including five hours on air commerce regulations, ten on aviation engines and ten on airplanes, including rigging, maintenance and repair. Requirements for limited commercial ground school courses specify five additional hours instruction on engines and airplanes and fifteen hours instruction in aerial navigation and meteorology. The minimum requirements for the

(*Continued on next page*)

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(Continued from preceding page)

transport ground schools specify that, in addition to the requirements for the limited commercial schools, ten additional hours instruction be given on engines, fifteen additional hours on airplanes, fifteen hours instruction in meteorology, ten hours on aircraft instruments and aviation radio and parachutes.

The final draft of the regulations was approved by Assistant Secretary MacCracken, and includes revisions made in a conference of school operators, a special committee of the Aeronautical Chamber of Commerce and department officials. The rating is to be undertaken under the Bingham amendment to the air commerce act. Although the rating by the department is entirely voluntary on the part of the schools, because of the advantages gained by schools which are approved by the department, it is expected that most of the bona fide training schools will seek regulation.

ELINOR SMITH SETS NEW ENDURANCE RECORD

MISS ELINOR SMITH set a new unofficial solo endurance record for women on April 23rd and 24th by remaining in the air over Roosevelt Field and the New York metropolitan area for 26 hours and 20 minutes. Miss Smith flew a Bellanca monoplane powered with a Wright Whirlwind engine on the flight which broke the former record, held by Mrs. Louise McPhetridge Thadden.

Miss Smith took off from Roosevelt Field on April 23rd shortly before noon with 210 gallons of fuel. Throughout the night she flew a course over Roosevelt Field guided by marking lights. Early in the morning the flier went to Montauk Point where she found smoother air than over the airport, but as the time neared that of the former record, Miss Smith went back to Roosevelt Field and continued her course. At two o'clock with two gallons of gas in her tanks, she landed, having raised the women's record 4 hours 18 minutes.

This is the second time in three months Miss Smith has set an endurance record for women. In February she remained aloft 13 hours 16 minutes, setting a record which was successively raised by Miss Bobby Trout and Mrs. Louise McPhetridge Thadden. The present record is nine hours short of the men's solo endurance record set the last of March by Martin Jensen.

STRIP MAP BULLETIN

THE Aeronautics Branch of the Department of Commerce recently issued Aeronautics Bulletin No. 10 (superseding Bulletin No. 11), listing all airways strip maps. Those already completed and available are listed separately from those still in process. Department of Commerce maps, Air Corps maps. and Hydrographic Office maps are each given separate listing. Bulletin No. 10 is available from the Department of Commerce, and completed maps also may be procured from the Department at a nominal cost.

SCHEDULE OF AERONAUTIC EVENTS

May 1-3. Joint meeting professional divisions, American Society of Mechanical Engineers, Detroit, Mich.

May 4. National Elimination Balloon Race for the Litchfield Trophy, Pittsburgh, Pa.

May 4-11. Montreal Second Annual Aircraft Show, sponsored by Montreal Light Aeroplane Club, Inc.

May 7. International Aeronautic Conference and Exhibition, Seville, Spain.

May 14. Fourth Annual Aircraft Engineering Research Conference, Langley Field, Hampton, Va.

May 15-25. Army Air Corps maneuvers, Columbus, Ohio.

May 16-18. First Annual Airport Convention at Cleveland, Ohio.

May 24-25. Aviation Show and Field Day, Winnipeg, Man., Canada.

May 25-June 1. First Annual St. Louis Aircraft Show, St. Louis, Mo.

May 27-30. National Aeronautic Meeting of the American Society of Mechanical Engineers, St. Louis.

May 27-30. Gardner Cup Races, Parks Airport, East St. Louis, Ill.

May 27-June 2. Indianapolis Aviation Show of the Indianapolis Aircraft Association, State Fair Grounds.

June 2. Air Meet, Buffalo, N. Y.

June 14. Dedication of Pontiac, Mich., municipal airport, preceded by air tour of Michigan.

June 14-15-16. Legion Second Annual Air Circus, Elkhart, Ind.

June 27-30. International Light Plane Meet, Amsterdam, Holland.

July 16-17. International Aircraft Exhibition of the Society of British Airport Construction, Olympia, London.

August 24-September 2. National Air Races and Aeronautical Show, Cleveland, Ohio.

September 6-7. Schneider Cup Race, over the Solent, Cowes, England.

September 15-21. Aviation Meet, Sioux Falls, So. Dak.

September 28. Gordon Bennett Balloon Trophy Race, Laclede Gas Co. property, 8900 South Broadway, St. Louis, Mo.

October 12-27. Southwestern Aircraft Exposition, State Fair Grounds, Dallas, Tex.

December 1-9. International Aeronautical Exposition of the Aeronautical Chamber of Commerce, Chicago, Ill.

N.A.C.A. ENGINEERING RESEARCH CONFERENCE

THE Fourth Annual Aircraft Engineering Research Conference will be held at the Langley Memorial Aeronautical Laboratory at Langley Field, Va., May 14. The conference will be held to ascertain aircraft design and construction problems confronting the industry to be incorporated in the research program of the National Advisory Committee for Aeronautics.

The conference will enable those present to hear and discuss first-hand reports on researches in progress, and to see the facilities of the laboratory, witness the methods used, and observe the progress of current investigations.

Executives and engineers of the aeronautical industry will attend the conference with representatives of the National Advisory Committee. The conference will be attended also by representatives of aeronautical trade journals and of universities teaching aeronautical engineering. The Committee will be represented by its officers, several members of the main Committee, the members of the standing committees on aero-dynamics and power plants for aircraft, and officials of its laboratory.

AIRPORT CONVENTION

THE first annual Airport Convention of the Aeronautical Chamber of Commerce will be held at the Hotel Cleveland, Cleveland, Ohio, May 15 to 18. Representatives of airports in all parts of the United States will attend the convention, and representatives of municipalities, civil organizations, engineers, architects, contractors and manufacturers will be present.

The program includes discussions and addresses on phases of airport lighting, landing fields, construction and care, interfield communication and meteorology, design and architecture, safety control, maintenance and administration, and standards of practice.

Authorities who will speak on the various phases of airport activities at the convention include Major John Berry, Col. H. H. Blee, Capt. C. M. Knox, William P. MacCracken, Jr., Gavin Hadden, Francis Keally, C. R. Stevenson, W. R. Gregg, F. C. Hingsburg, E. K. Smith, W. E. Rosengarten, Prof. H. J. Freeman, George E. Martin, F. H. Frankland, and Wendell P. Miller.

CIVIL SERVICE EXAM.

Inspector of Airways Construction

THE United States Civil Service Commission has announced an open competitive examination to fill the position of inspector of Airways Construction. Applications for inspector of airways construction must be on file with the Civil Service Commission at Washington, D. C., not later than May 14. The entrance salaries range from $2,300 to $2,800 a year. Higher salaried positions are filled through promotion.

The duties consist of the inspection of the work of contractors engaged in the installation of lighting facilities along the civil airways of the United States. The work

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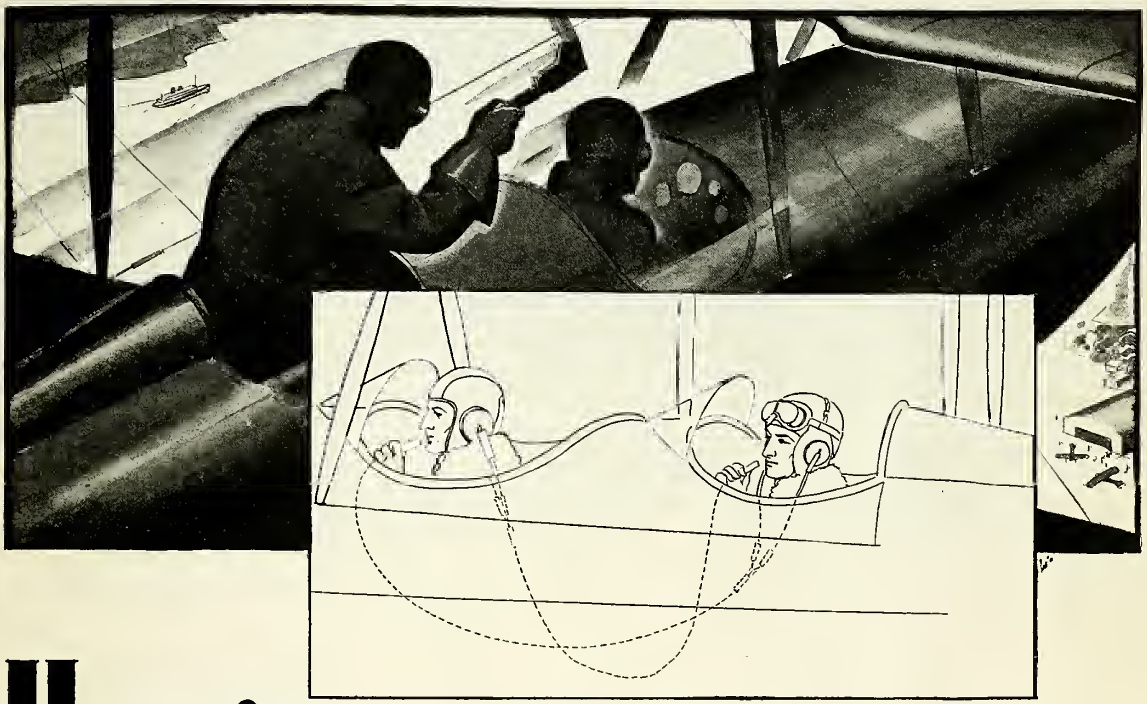
Don't *smack him with a monkey wrench*



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(Continued from preceding page)

comprises the installation of wiring, fitting, and the installation, and putting into commission, of various styles of electric and acetylene beacon lights, as well as gas engine driven generators; and the inspection of structural steel, concrete, and wooden structures.

Full information may be obtained from the United States Civil Service Commission, Washington, D. C., or from the secretary of the United States Civil Service Board of Examiners at the post office or customhouse in any city.

NATIONAL MODEL MEET

THE approach of the 1929 National Model Airplane Meet to be held in Detroit, June 20-22, finds 100,000 more boys and girls than last year building, flying and rebuilding their planes in anticipation of winning a trip to Detroit, and possibly to Europe.

The Airplane Model League of America, conceived and organized in 1927 by Griffith Ogden Ellis, editor of the *American Boy* magazine, now has a membership of over 300,000 model plane builders, carving balsa propellers, studying lift and drag, and insuring America's future air supremacy.

Last June, the National Meet brought 300 model builders with their planes from every corner of the United States, and even one from Hawaii, to determine the champions in the three different classes of model airplanes; outdoor, indoor, and scale model. When the last plane had spiraled to earth on June 30, two boys, Tom Hill of Winston-Salem, North Carolina, and Aram Abgarian of Detroit, had won the *American Boy* trips to Europe, and William Lofton Dennis, of Miami, Florida, the scale model champion's trip to the National Air Races in California given by Aero Digest.

This year, Aero Digest will send the scale model winner with the outdoor and indoor champions to fly their planes at Croydon Field, and to exhibit them in Paris as well as to have some long, eager looks at a lot of the famous old places of Europe.

Twenty-eight leading newspapers of the country, and scores of department stores and business clubs in different cities will hold local preliminary contests to determine model plane champions who will be sent to the National Meet in Detroit. Thousands of tiny propellers are already whirring and spinning in preparation for the meet, and model plane builders from Miami to Seattle are experimenting, changing, observing their planes to develop models that will virtually carry them to Detroit—and possibly to Europe—or share in the $3,000 in cash prizes and the hundreds of cups and medals offered by the *American Boy*.

The airplane model contest rules, approved by the National Aeronautic Association, state that the only resriction on the design of indoor models is that they shall have a distance between the propeller bearing and the motor hook, fastened to the opposite end of the motor stick, not to exceed fifteen inches, and that outdoor models shall have a wing span not to exceed forty inches. Both indoor and outdoor planes must be hand launched, and the only motive power may be that derived from the use of rubber bands. Scale models are, of course, judged by the accuracy with which they reproduce man-carrying planes, and the N. A. A. rules specify that they must have an exact wing span, including ailerons, of twenty-four inches.

This year, scale models are coming in for more attention. George F. McLaughlin, editor of Aero Digest, will be chief scale model judge, and he will have carefully inspected and measured more than 300 planes before announcing which boy under twenty-one years of age should start getting his passport and preparing to sail for Europe on the Canadian Pacific liner, *Duchess of Bedford* with the outdoor and indoor champions and Franklin M. Reck, assistant managing editor of the *American Boy*.

PASSENGER PARACHUTE SUCCESSFULLY TESTED

ON Wednesday, April 3rd, public tests were made of a new passenger parachute developed by the Switlik Mfg. Company of Trenton, N. J. In response to an invitation by the manufacturer, a representative of Aero Digest witnessed the tests conducted at Mercer Airport, on the outskirts of Trenton. About 2,000 persons attended the demonstration and fifteen airplanes were flown to the field from Dayton, Philadelphia, Bristol and Washington carrying army and navy officials and technical men, among them Alvin Starr, one of the Navy's parachute experts.

The new chute was designed by Floyd Smith, well known parachute inventor. The airplane used in the demonstrations, an open cockpit Ryan monoplane, was flown by Mr. Smith. The device is an arrangement whereby the passenger is released through a trap door in the floor of the cockpit, the parachute automatically opening and requiring no manipulation on the part of the passenger. In an emergency where it is desirable for the passenger to descend by means of the parachute, the pilot pulls a lever which opens the door under the passenger's cockpit, the seat folds downward allowing the special seat cushion (to which the parachute and passenger are fastened) to drop through. The apex of the parachute is attached to the plane by a cord which causes the chute to unfold after it has dropped sufficiently to clear the plane. When the chute has unfolded the attaching cord breaks, the chute spreads out and descends, the passenger being carried swing fashion on the seat cushion.

The first drop was made from an altitude of about 1,000 feet by a young lady, Miss Marie Smullin, of the Naval Aircraft Factory. The apparatus functioned perfectly and a graceful landing was made well within the boundaries of the airport. A drop was later made by M. R. B. Taylor, who landed easily on his feet and reefed in the parachute as it came to rest.

Technical questions relating to the device were answered by Mr. Smith and Mr. William A. Schlegel of the Switlik Company. Other attending the demonstration were: Major Oliver P. Echolis, chief engineer of the material division at Dayton, Ohio; Commander W. L. Webster, of the United States Navy at Washington; Lieutenant J. K. Harper, of the United States Navy, and Captain Emory S. Land, of the Guggenheim Foundation.

FOREIGN PLANES IN CANAL ZONE

THE first foreign commercial airplane entered the Panama Canal Zone recently when a 350 horsepower Junkers amphibian owned by Scadta landed at Cristobal to arrange for a weekly passenger service between Colombia and the Canal Zone. The landing of the Colombian plane was a result of the recent executive order establishing regulations for the flight of foreign craft over the Canal area. Scadta has been petitioning or two years for permission to land in the Canal Zone.

A weekly service will be started between Cristobal and Barranquilla, as soon as negotiations between the United States and Panama governments are concluded. W. Y. Body, the Panama fiscal agent of Scadta, deposited $25,000 with the collector of the Panama Canal until a bond with an American security company guaranteeing the observance of the United States regulations is arranged.

The Scadta (Sociedad Colombo Alemana de Transportes Aereos) is a non-subsidized German-Colombian corporation, which has operated since 1920. Scadta is now operating fifteen amphibians over the rivers which border the forests from Barranquilla south to the capital, Bogota, and from Barranquilla to Buenaventura, via Cartagena, and also between Buenaventura and Port of Paita, Peru, via Guayaquill, Ecuador.

A.S.M.E. AERONAUTIC MEETING IN ST. LOUIS

FORTY-THREE technical papers discussing phases of the whole field of aviation will be read before the third national aeronautic meeting of the American Society of Mechanical Engineers to be held in St. Louis May 27 to 30. Dr. Vilhjalmur Stefansson will speak at the association banquet.

The meeting, which will be held while the Gardner Cup Races and the St. Louis Aircraft Show are in progress, is planned to supply a forum where all interested in the aeronautical industry may discuss problems and gather information. The program of papers will include articles by the following authorities: *Pilot and Flight Training:* William P. MacCracken, Clarence M. Young, Tex Rankin, Oliver Parks, and Lieut. George B. Fairlamb; *Air Transport:* Lieut. C. N. Monteith, C. C. Moseley, R. W. Ireland, C. S. Jones, and C. H. Mathews, Jr.; *Problems of Flying:* Lieut. J. H. Doolittle and C. G. Andrus; *Aircraft Instruments:* John D. Peace, Jr., and Dr. W. G. Brombacher; *Lighter-than-Air Craft:* Lieut. F. W. Reichelderfer, Charles P.

(Continued on next page)

ANOTHER ONE OF THE 65 MANUFACTURERS IN THE
AVIATION INDUSTRY THAT USES SKF BEARINGS

Scintilla Magneto Co., Inc.

YOU MAY BUY A
BEARING AS A
BARGAIN BUT
TRY AND GET A
BARGAIN OUT OF
USING IT

for
Nothing is apt to cost so much
as a bearing that cost so little

SKF
Puts the
Right Bearing
in the
Right Place

Worry-Proof Operation of Scintilla Magnetos Makes SKF Bearings Worth a Little More

FOR that extra factor of safety in the air—every component part of mechanical equipment must reflect the utmost of quality in material and workmanship to insure dependability. Therefore, Scintilla could not sacrifice the reliability of this vertical aircraft magneto to save a few cents on its bearings—they selected SKF.

The utmost precision and smooth running of SKF Ball Bearings at high speeds is unimpaired by continuous service. In fact, they last for the life of the equipment on which they are used as the wear is negligible and adjustments are never required. Such worry-proof service of SKF—the highest priced bearing in the world—is worth a little more to Scintilla and 64 other manufacturers in the aircraft industry using SKF.

SKF INDUSTRIES, INC., 40 East 34th Street, New York, N. Y. 2273

SKF

Ball and Roller Bearings

(*Continued from preceding page*)

Burgess, Lieut. Commander C. Dennis Burney, Robert T. Pollock, Carl B. Fritsche, Thomas J. Blakemore, J. F. Boyle, Joseph B. Strauss, Commander C. E. Rosendahl, and E. G. Luening; *Structural Analysis:* George W. De Bell, W. T. Schult, Dr. Michael Watter, contributing editor of AERO DIGEST, Lloyd Harrison, B. C. Boulton, and John G. Lee; *Engines:* C. H. Schowalter, L. M. Griffith, E. T. Vincent, Glen D. Angle, Lieut. Commander J. M. Shoemaker, Arthur Nutt, and Louis C. Breguet; *Airports:* Philip R Love, and Major John Berry; *General Topics:* W. B. Robertson, Prof. Hugo Junkers, E. R. Polley, S. C. Clark, J. H. Dellinger and H. Diamond.

AIRWAY MILEAGE

AIRWAYS operating in the United States on March 30 totalled 21,392 miles according to a report of the Aeronautics Branch of the Department of Commerce. Transport companies operating over these airways were flying 57,516 miles daily at that time.

Of the total mileage of airways, 4,442 were included in nine foreign routes. Of the daily mileage, 39,216 miles are in the air mail services and 18,300 miles in passenger carrying and other services.

CIVIL SERVICE EXAM

Foreman (Aviation Engine Mechanic)

ANNOUNCEMENT of open competitive examinations for foreman (aviation engine mechanic) at $2,600 to $3,100 per year, and as associate mechanical engineer at $3,200 to $3,700 a year, has been made by the United States Civil Service Commission. A vacancy in the position in the Engineering Division, Air Corps, Wright Field, Dayton, Ohio, and vacancies in positions requiring similar qualifications, at approximately the same rate of pay, will be filled from these examinations unless it is found in the interest of the service to fill any vacancy by reinstatement, transfer, or promotion. The receipt of application closes May 25. These examinations are open to all male citizens between 25 and 55 who meet the requirements, though those living near the location of the work will receive preference.

NEW PAMPHLET ON MICARTA PULLEYS

SPECIAL publication D.M.F. 5088-A, describing Micarta airplane pulleys has just been released by the Westinghouse Electric and Manufacturing Co., through the Westinghouse Technical Press Service, East Pittsburgh, Pa.

Micarta pulleys are known for their wearing ability and for their light weight.

Complete tables of style numbers, sizes and prices are given in the leaflet.

PAUL H. BRATTAIN is in charge of the Washington office of the Aeronautical Chamber of Commerce recently opened at 17th and I streets, Washington, D. C.

WASHINGTON D. C. NEWS

By WING OVER

PROBABLY the most unique airplane sightseeing service in the country is that of the Potomac Flying Service at Hoover Field. During Easter week, 1,704 passengers were carried, and for the month ending April 15, the 3,000 figure was exceeded, according to General Manager John S. Wynne. The reason for this large passenger hop business is, of course, the appreciable number of visitors from all over the world who desire to view the Capital City from above. Mr. Wynne states that approximately 70 per cent of his customers have not flown before and that only 5 per cent of the passengers are residents of this locality. The railways and bus companies coöperate in selling tickets for these flights over Washington.

Captain Ira Eaker will act as operations manager for Potomac Flying Service and its allied companies. Present equipment consists of a Wasp Fairchild on floats, a Loening amphibian, a Travel Air biplane, and a Whirlwind 5-passenger New Standard. Several New Standards are reported to be on order for operation from the 1,800 by 700 foot Hoover field.

THE District of Columbia Airport Committee, of which Senator Hiram Bingham is chairman, met during the middle of April. Col. Harry Blee, Chief of Airports, Aeronautics Branch, reported on the sites available as did Porter Adams. N. E. Duffy and Jack Berry, managers of the Buffalo and Cleveland airports respectively, presented some pertinent suggestions. Hoover Field, Washington Airport, the Hybla Valley Field at Mt. Vernon and the Congressional Airport near Rockville, Maryland, were reported on as being more suitable than Gravelly Point. Major Davidson of the Army Engineer Corps said that $2,600,000 would be needed and that the District government should supply half the amount with Congressional appropriation for the remainder.

J. B. LOCKWOOD of the Textile Division, Department of Commerce, is making a study of new uses for cotton in the aeronautics industry. He recently interviewed airplane manufacturers in New York and arranged for an experimental marker at Hoover Field last month. The marker is of painted canvas and will be on the roof of the Potomac Flying Service's new hangar.

MAJOR HARRY HORTON'S CONGRESSIONAL AIRPORT, INC., has a new steel hangar 60 by 80 feet. This organization as distributors for Command-Aire in this territory, may assemble the planes on the field.

A GROUP of local business men headed by George Babcock are planning to use Consolidated Husky Jrs. at the recently organized flying school at College Park, Md. This group has a lease on the field and plans to improve it. This is believed to be one of the few fields in the territory which will obtain an A1A rating from the Department of Commerce without unreasonable expenditures.

PITCAIRN is using the Army's Bolling Field at present, but is looking for better landing facilities. College Park, Md., is not much farther from the city proper than Bolling; the latter is equipped for night flying which will preclude the possibility of Pitcairn's removal for some time. In connection with Pitcairn, the Capitol dome is now lit up at night as the result of a request from this company.

CAPTAIN "JACK" W. DAVIS, who is Assistant Trade Commissioner for Aeronautics for the Department of Commerce, writes from Rio de Janiero that the Brazilians are becoming increasingly airminded. He states that there are now 31 commercial pilots in the country and that there is a need for more ships. Davis was an ace with the American Air Service in France, was with the Curtiss Exhibition Company and later joined up in the Marine Corps. He would like to hear from any of his old friends, who may address him care of the American Commercial Attaché, Rio de Janeiro, Brazil.

THE Airways Division, Aeronautics, Branch, is planning to survey the route between Washington and Pittsburgh which presents good opportunities for an air mail route to feed the transcontinental line west. Ted Haight is the pilot who will probably make this survey.

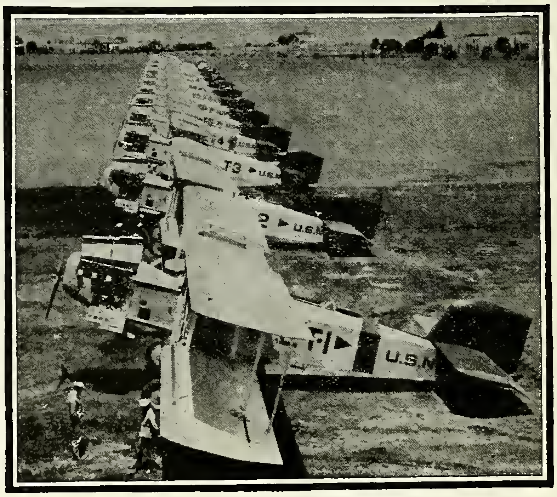
CAPTAIN IRA C. EAKER, chief pilot of the *Question Mark,* has resigned from the army in order to become operations manager of Atlantic Seaboard Airways, Inc., according to a recent announcement. This firm plans the operation of a chain of airports along the eastern seaboard, with Hoover Field in Washington as control base. Airlines will be maintained between the airports the corporation controls.

DAVID S. INGALLS, Assistant Secretary of the Navy for Aeronautics, has been appointed to the advisory board of the National Aeronautic Association, according to a recent announcement of Senator Hiram Bingham, president of the association.

REGULAR twice-daily weather reports from stations in the United States and Canada are now being sent by teletype printers from Washington to airports at Hadley Field, N. J., Bellefonte, Pa., and Cleveland. The reports include upper-air data from twenty aerological stations.

SEVENTY-FIVE representatives of the aviation industry and the National Board of Fire Underwriters recently met in Washington and discussed the third draft of regulations for the construction and protection of airports. The meeting was called by the Aeronautics Branch of the Department of Commerce to give opportunity for an exchange of views upon the proposed regulations. (*Continued on next page*)

TIME TESTED ON MARTIN SHIPS



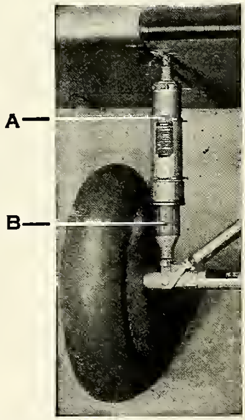
IN 1926, The Glenn L. Martin Company adopted Aerol Struts as standard equipment on the Martin T3M1. When the T3M2 was developed a year later these struts were again engineered into the design. Throughout these years Aerol Struts were confirming the engineer's good opinion of them and contributing substantially to the fame of Martin performance.

In 1928, Martin engineering rose to a new peak in the T4M1 (The "74"). Once again Aerol Struts were selected above all other landing-shock absorbers and made standard equipment.

These facts are significant for two reasons. First, it is unquestionable proof of Aerol Strut performance. Secondly, it is evidence of the supremacy of Aerol Struts as an aid to smoother, safer landings. With a host of substitute equipment to choose from, Martin engineers time and time again re-affirmed their confidence in Aerol Struts.

This confidence is reflected by 21 other manufacturers who have already standardized on this equipment, and by practically all other American manufacturers who are recommending Aerol Struts as optional equipment.

Aerol Struts are manufactured by The Cleveland Pneumatic Tool Company, Cleveland, Ohio.



This view shows how Aerol Struts are installed between the fuselage and wheels. "A" is the stationary cylinder. "B" is the sliding piston attached to the axle, allowing perfect freedom of movement, yet effectively eliminating destructive shock before it reaches the fuselage.

Ask the Pilots Who Land On Them

AEROL *shock absorbing* **STRUT**

(Washington, D. C., News continued)

THERE were 517,560 pounds of mail transported over the 23 domestic air mail routes during the month of March, 1929, an increase of 77,741 pounds over February, according to figures announced recently by Postmaster General Brown.

NEW YORK AIR NEWS

THE E. W. Bliss Company of Brooklyn exhibited the new Jupiter engine at the recent All-American Aircraft Show at Detroit. The engine attracted the particular attention of Henry Ford during his visit to the show. Features of the engine were explained to him by Jack Tucker, who was special instructor on engines to Commander Byrd at Pensacola, Fla., in 1918. Admiral William A. Moffett also was especially interested in the engine during his tour of the show.

New Washington-New York Air Mail Service

COMMENCING May 5, a new air mail service will be inaugurated between New York City and Washington in connection with the double service between New York and San Francisco, according to a recent announcement of postal officials. The plane will leave New York at 5 a.m., Philadelphia at 5:50 a.m. and reach Washington at 7 a.m. Northbound the plane will leave Washington at 6:45 p.m., Philadelphia at 8:25 p.m., and reach New York at 9 p.m.

If the necessary arrangements can be made with the officials of Baltimore, that city will be included in the service.

J. DON ALEXANDER was elected chairman of the Commercial Manufacturers' Section of the Aeronautical Chamber of Commerce at the meeting of that section in Detroit during the All-American Aircraft Show. The election of an executive committee of the geographical divisions, a recommendation for an export section, and the formation of two new sections, were the other chief actions at the Detroit meeting. The meetings were well attended by aircraft manufacturers from all parts of the United States.

A Legal and Legislative research section was formed under the leadership of Professor H. J. Freeman, who outlined the work of the new department. A committee was appointed to work with Prof. Freeman in the preparation of a code of ethics for the industry in general. Organization of an Aircraft Dealers and Distributors section was begun. Under the plan recommended to the Board of Governors of the Chamber, aircraft distributors and dealers will have their own separate section with representatives on the various committees. It was pointed out that close coöperation between the plane manufacturers and their distributors and dealers would work to mutual advantage.

With a report by R. B. C. Noorduyn of the Bellanca Aircraft Corporation on general standardization, a general standardization committee was appointed to work with the Society of Automotive Engineers in devising a plan for the more systematic extension of aircraft standardization. The committee consists of R. B. C. Noorduyn, chairman; J. R. Cautley, and Arthur Nutt. The following were elected to the regional executive committee: C. N. Monteith, Northwest Division; Allen Lockheed, Southwest; J. Don Alexander, South Central; Thomas Hamilton, North Central; J. C. Brukner, East Central; R. B. C. Noorduyn, Northeastern; and Richard Depew, committeeman-at-large.

"FLYING Model Airplanes" is a booklet published by the U. S. Model Aircraft Corporation of Brooklyn, showing the model airplanes and model-making supplies and accessories sold by the firm. Complete parts of the diminutive planes, as well as tools for assembly, are handled to aid those constructing models.

THE D. W. Flying Service, Inc., of LeRoy, N. Y., opened its flying school at the Donald Woodward Airport on April 15. Instruction now in progress at the school includes regular training in open and cabin landplanes, amphibians, and flying boats.

Donald Woodward Airport is one of the most complete privately owned airports in the country. It has four crushed stone runways ranging in length from 2,600 to 3,300 feet, adequate hangar and office space, and is well drained. The airport was designed by Russ Holderman, who has been active in aeronautics since 1914 and who is manager of the D. W. school.

The school offers a primary and an advanced course in flying, in which is included ground instruction. The ground school work includes history, design, construction, rigging, and maintenance of airplanes; theory, construction, maintenance and trouble-shooting of engines; instruments, meteorology, navigation, and Department of Commerce law.

THE New York Aircraft Distributors, Inc., of Curtiss Field, Long Island, has been assigned Fairfield County, Connecticut, in addition to its New York territory for the sale of Waco planes.

ADVANCE Aircraft Airport at Valley Stream, Long Island, has recently erected a 150-foot all-metal airplane hangar. Three new hangars with spans of 70, 80, and 100 feet will be erected at once.

FIVE new directors were elected to the board of directors of the Curtiss Flying Service, Inc., at the recent annual meeting of that body. The new directors are Daniel M. Sheaffer, Major C. C. Mosely, E. A. Landreth, Arnold C. Dickinson, and William R. Cranford, Jr.

CLIFFORD W. HENDERSON has been appointed manager of the aircraft show section of the Aeronautical Chamber of Commerce of America, Inc. Mr. Henderson directed the 1928 Los Angeles National Air Races and Aeronautical Show, and will handle the 1929 Air Races and Aircraft Exposition to be held in Cleveland August 24 to September 2.

CUNNINGHAM-HALL Aircraft Corporation was recently organized at Rochester, N. Y., for the manufacture of airplanes. This firm will apply the manufacturing experience and facilities of the Jas. Cunningham, Son and Co., motor car manufacturers, to the production of aircraft.

The officers of the concern include Francis E. Cunningham, president; Jas. C. Dryer, vice president; Wilber R. R. Winans, secretary; John W. Fulreader, treasurer; Randolph P. Hall, chief engineer; Paul Wilson, chief test pilot, and directors William C. Thomas and Augustine J. Cunningham.

THE Advance Sunrise Airport, a 100-acre landing field on Long Island, eight miles from Brooklyn, was formally opened recently. The field will have four runways 100 feet wide, two being 2,000 feet long and two 2,250 feet. Six steel hangars are being erected, and a beacon with approach and obstacle lights is being installed. Repair shop, gas station, administration building, show room, and restaurant will be added to improve the airport.

CURTISS Flying Service has received orders for 136 Curtiss Challenger 170 horsepower engines from the Travel Air company of Wichita, Kans., and Command-Aire, Inc., of Little Ark., according to an announcement of officials of the firm. Delivery on the orders will start at once and continue throughout the year.

FRANK L. HALE has been appointed general business manager of the Curtiss Flying Service, Inc. He will act in a supervisory capacity for the Curtiss chain of airports.

A BOARD of city air advisors was appointed by Mayor Walker of New York City to study aviation conditions and to recommend to the Board of Estimate desirable sites for additional airports in the city. These advisors include: Peter J. Brady, chairman, Charles F. Kerrigan, Arthur S. Tuttle, Michael Cosgrove, William J. Pedrick, S. C. Mead, John J. Duffy, Frank Tichenor, publisher of AERO DIGEST, United States Senator Wagner, Representative Loring Black, Major John Dwight Sullivan, W. J. L. Banham, Harry F. Guggenheim, George F. Trommer, Ralph Jonas, Generoso Pope, Frederick B. Rentschler, Dr. G. E. Sayfarth, Otto J. Kalt, Emil Witzel, Frank Polk and Fred G. Lemmerman.

LADY MARY HEATH recently completed a sales tour of Pennsylvania, Maryland and Missouri, in the interests of the American Cirrus Engines, Inc., for which concern she is technical advisor.

KEYSTONE Aircraft Corporation recently announced the appointment of the Thompson Aeronautical Corporation as distributors of Keystone-Loening products in Ohio and Michigan.

(Continued on next page)

The Result of Unified Design –

The ARGO

Trim, alert, responsive, an Argo in the air seems far more than a thing of metal, wood and fabric. Rather does she become a part of her pilot.

Does he call for speed? It's his to command—125 miles per hour. Climb? Like an eagle. A swift maneuver or a graceful turn? Response to her controls as though she sensed her pilot's every thought.

Fly an Argo, for fun or profit. Soon will the plane be a part of yon.

AA

Perfect team work is the secret of most success. And team work explains the Argo.

A ship built for her engine. An engine built for the ship. The Argo Airplane and the Hess-Warrior Aircraft Engine are the product of one organization. Designed for each other in such an intimate way, it is small wonder that the performance of this perfect team is outstanding.

Here is pursuit ship performance in a commercial plane at a price that is changing many ideas of airplane values.

AA

The
HESS·WARRIOR
Air Craft Engine

The **ALLIANCE AIRCRAFT CORPORATION**, Alliance, O.

(*New York Air News continued*)

WILLIAM WINSTON has been appointed director of student aviation training for all schools to be maintained by the Curtiss Flying Service. Mr. Winston will conduct an instructors' class in Detroit to give proper training methods to Curtiss flying instructors.

CURTISS Flying Service has leased the Chickering Building, New York City, for use as national headquarters and as permanent show rooms for planes and motors sold by the organization.

The show room will occupy the ground floor, a space of approximately one hundred by forty feet. It will be designed, decorated and arranged for a continuous display. On the fourth floor will be the general operating, business management and executive offices. The entire fifth floor will be devoted to the sales department. Accounting, public relations, advertising and traffic departments will occupy the third and sixth floors.

INSTRUMENT equipment for 800 Travel Air planes has been ordered from the Consolidated Instrument Company of America, Inc., by the Travel Air Manufacturing Company of Wichita, Kans., according to J. Leopold, president of the Consolidated firm. The order, which amounts to $119,000, will include the following instruments: bank and turn indicators, tachometers, altimeters, air speed indicators, compasses, oil pressure and temperature gauges, and ignition switches.

WILLIAM H. MALLON, INC., consulting engineering firm to the aviation industry, has moved its offices to 285 Madison Avenue, New York City, from its former offices in the Graybar Building. This change was necessitated by the need for more space.

THE tenth Fairchild in the Mexican commercial service, a 71 seven-place cabin monoplane, was flown from Fairchild Field at Farmingdale, L. I., to Tampico recently by Dan Beard pilot of the Mexican Aviation Company. The Mexican commercial service links Brownsville, Texas, with Tampico and Mexico City, and Tejeria, Vera Cruz, with Campeche and Merida.

AS the result of an ever-growing demand through hardware stores and aero supply houses, the Casein Manufacturing Company, New York City, has announced a complete line of smaller packages (½, 1, 5 and 10 pounds sizes) of an easy mixing grade of Casco waterproof glue particularly adapted for the small user.

This is a Casein product used extensively throughout the aeronautical industry in the construction of plywood and glued-up construction of airplanes, and the addition of these smaller packages makes possible for the experimenter or model builder and bench worker to obtain the same results which are being enjoyed by the larger manufacturers.

F. B. RENTSCHLER was recently elected president of the Aeronautical Expositions Corporation, which handles official aircraft shows for the Aeronautical Chamber of Commerce. The other officers of the corporation are: J. C. Hunsaker, vice president; S. S. Bradley. vice president and general manager; Luther K. Bell, secretary; and Owen A. Shannon, treasurer.

Edgar N. Gott, Walter H. Beech, and Charles J. Brukner were elected governors of the Aeronautical Chamber of Commerce to fill vacancies caused by the resignation of Lester P. Gardner, Paul Henderson, and C. L. Lawrance.

SCINTILLA MAGNETO COMPANY, INC., has doubled the floor space of its factory at Sidney, N. Y., with the recent completion of a new factory addition to the plant. The addition will increase production from 1,200 to 2,000 magnetos each month.

The new factory building is of brick, steel, and concrete construction, thoroughly fireproof, and is equipped with modern automatic machinery. It adds 40,000 square feet of floor space to the 40,000 square feet formerly in use. There are now 475 employees at the plant of the Scintilla company, which is operating 24 hours a day to meet the demand for its product.

BARBER AND BALDWIN, INC., of New York City, has been appointed general aviation underwriting agent for the Liverpool and London and Globe Insurance Company, and the Globe Indemnity Company. The Aero Engineering and Advisory Service, Inc., will render an inspectional service for Barber and Baldwin through its corps of aeronautical engineers throughout the country.

R. S. McKIM was recently added to the staff of the aeronautical department of Valentine and Company, producers of Nitro-Valspar. Mr. McKim was tor seven years with the Engineering Division of the United States Air Service at Dayton, Ohio.

SHIP-AIR service was to be inaugurated April 20 between New York, Panama, and ports of Colombia and Ecuador, South America. by the Grace Line. This service was begun by the new motorship *Santa Inez*, especially built for this service.

The new service will be coördinated with the air transport service which is being carried on by the Pan American-Grace Airways, Inc., and the Peruvian Airways Corporation on the West Coast of South America. It will be possible for travelers to buy combined air-motorship tickets, enabling them to make any desired combination of the two methods of travel.

PETER TALBOT has been appointed operations manager and chief pilot for Coastal Airways, Inc., according to a recent announcement of F. W. Dalrymple, president of the organization. In this position Mr. Talbot will be in charge of all operations of the Coastal lines. He is naval flier No. 71 and has been active in aviation since 1911.

INSTRUMENT equipment for 300 airplanes will be supplied to the Nicholas-Beazley Airplane Company of Marshall, Mo., by the Consolidated Instrument Company of America, Inc., according to J. Leopold, president of the latter concern. The navigation equipment will be used in the Barling NB-3 airplane.

Comet Engine Corporation

THE Comet Engine Corporation has been formed under the laws of Delaware to acquire the stock of the Aircraft Engine Corporation of California, manufacturer of the Comet seven-cylinder radial 150 horsepower engine. The new corporation will acquire the entire business and assets of the California concern, and will continue the manufacture of the Comet engine.

The reorganization of the business was effected with the aid of Air Investors, Inc., and its associates, to provide capital for the necessary expansion of the business to meet the demand for Comet engines. Manufacture of the Comet engine will be continued at the plant of The Aircraft Engine Corporation of California at Oakland, pending completion of a new plant to be erected and equipped by the Comet Engine Corporation, the location of which has not yet been determined.

Officers of the Comet Engine Corporation are: Harvey L. Williams, president; John H. Geisse, vice president; and George H. Johnson, vice president. Directors other than the officers include Alan J. Lowrey, George Mixter, and Sherman M. Fairchild.

JOHN S. ALLARD, Major Melvin Hall, and Thomas A. Morgan were elected vice presidents of the Curtiss Aeroplane Export Corporation at a recent meeting of the board of directors of the firm, according to C. W. Webster, president.

Mr. Allard will act as general manager of the export company. Major Hall is now touring the Orient and will open an office in Paris soon. Mr. Morgan, recently elected president of the Sperry Gyroscope Co., will be associated with foreign relations, operations and extension.

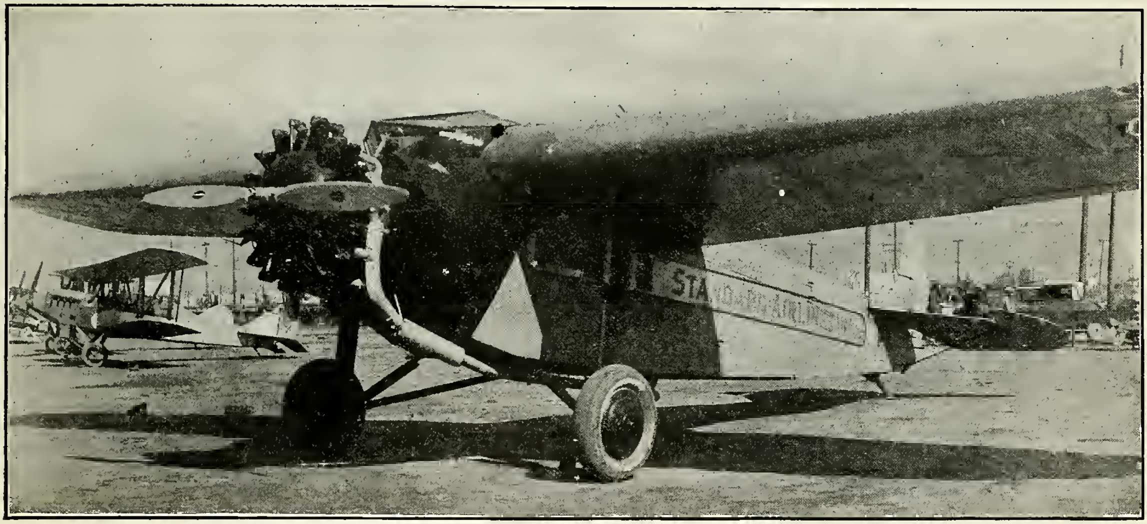
AN order for 754 pressure gauges and 500 temperature recorders has been received from the Pioneer Instrument Company of Brooklyn by the Moto Meter Company of Long Island City, it was announced recently by Henry Boynton, aeronautic director of the Moto Meter concern.

Curtiss Flying Service Opens Training Classes

THE Curtiss Flying Service, Inc., officially opened its training classes, ground school exhibit and registration offices located in the South Building of New York University (Washington Square Branch), New York City, on April 15th, 1929. Mr. Roland H. Spaulding, a specialist in aeronautical education at New York University, is in charge of the training classes and ground school exhibit. Classes meet at 7 p.m. and 8:30 p.m. on Monday, Wednesday and Friday of each week. The entire course covers a period of eight weeks. The educational

(*Continued on next page*)

FLY SAFER WITH U. S. RUBBER PRODUCTS



U. S. Royal equipped Fokker Super Universal operated by Standard Airlines, Inc.

What Latex-treated Web Cord brings to Aviation

MUCH of the best thought of our time is being devoted to the development of Aircraft.

And in the matter of Tires—the greatest contribution to Safer Flying is the *Latex-treated Web Cord* as used in building U. S. Royal Airplane Tires.

The Web Cord brings three principal factors into flying—

Maximum Strength
Maximum Resiliency
Lightest Weight

As in Tires, so all along the line of Rubber Products, the United States Rubber Company is contributing its most versatile experience to the technical requirements of Aircraft and Airport maintenance and for the human wants of Pilot, Mechanic and Passengers: Rubber Mechanical Products; Rubber Clothing and Footwear; and again, U. S. Royal Airplane Tires, both Anti-Skid and Plain Treads.

All sizes of these tires, in both treads, in stock at strategic Branches and at your service through U. S. Tire Dealers all over the country.

United States Rubber Company
TRADE MARK
1790 Broadway New York, N. Y.

U.S.ROYAL
AIRPLANE TIRES

(*New York Air News continued*) schedule calls for lectures on theory of flight, aviation, ignition, carburetion, aircraft instruments, aircraft engine instruments, meteorology, aerology, etc., and practical shop work in construction and rigging of planes and repair and overhaul of motors, supplemented by text books for home study.

EMBRY-RIDDLE AVIATION CORPORATION was formed recently under the laws of Delaware to take over the Embry-Riddle Company of Cincinnati. The new company will be controlled by the Aviation Corporation.

COLONIAL AIR TRANSPORT inaugurated its New York-Boston air passenger service on April 15, using trimotor Ford transport planes. Terminals for the service are located at Hotel Pennsylvania in New York, and at the Hotel Statler in Boston. Buses transport passengers between the landing fields and terminals. There are two round trips each day from both terminals on the inter-city service.

WILLIAMS AIRDROME DEVELOPMENT CORPORATION opened its 200-acre sea and landplane airport on Jamaica Bay on April 20. The port, which has a 2,500-foot beach front, is 35 minutes from the business center of New York City. Trolley, bus and subways will serve the field.

Six hangars, each with a capacity of eight planes, will be built, as well as restaurant, recreation grounds, medical department, and bathing equipment. Miss Olive Branch Williams is head of the Williams Airdrome Development concern.

LIEUT. STANLEY W. YOUNG was recently appointed superintendent of service for Air Associates, Inc., at the Curtiss and Roosevelt Field stations of the firm. Lieut. Young served with the Third Aero Squadron during the war and has since connected with the Curtiss Aeroplane and Motor Co.

JOHN D. MacGREGGOR, vice president of Pan American Airways, has resigned his position to become vice president of Pan American-Grace Airways. In the new position Mr. MacGreggor will direct preparations for the air service between Mollendo, Peru, and Panama. This service will be a link in the Miami-Santiago, Chile, route of Pan American Airways and Pan American-Grace Airways.

THE American Aeronautical Corporation recently purchased twelve acres of shore-front at Manhasset Island, Long Island, N. Y., to be developed into a seaplane landing base, and a testing field for Savoia-Marchetti planes to be manufactured in America by that firm. A school for pilots of flying boats will be conducted at the Manhasset Island base.

Construction of the first American-built Savoia-Marchetti planes is progressing rapidly in the American Aeronautical Corporation factory at Whitestone, L. I. Alessandro Passeleva, test pilot of the Italian firm, will train the American factory pilots in flying the seaplanes.

CONTROL of the Fairchild Aviation Corporation and its seven subsidiary concerns was obtained recently by the Aviation Corporation, according to an announcement of Graham B. Grosvenor, president of the $200,000,000 holding and development concern.

Chief of the Fairchild subsidiaries is the Fairchild Airplane Manufacturing Corporation. The others are Fairchild Aerial Camera Corporation; Fairchild Aerial Surveys, Inc., Fairchild Aviation, Ltd., of Canada, Fairchild Flying Corporation; Fairchild Engine Corporation; and Fairchild Boats, Inc.

The transfer of control will not affect the present management of the various Fairchild subsidiaries.

ORDERS for 300 Irvin Air Chutes have been received from the Russian Soviet government by the Irving Air Chute Company, Inc., supplementing a previous order for 200 parachutes. The English factory of the Irving firm will aid the Buffalo plant in filling these and other governmental orders.

NEW factory additions which will triple the output of its plant are being erected by the Molded Insulation Company of Mount Vernon, N. Y., a subsidiary of the Consolidated Instrument Co. of America, Inc. Addition to present manufacturing facilities has been necessitated by rapid expansion of sales for ignition switch equipment to the automotive, marine and aviation industries, according to J. Leopold, president of the Consolidated company.

ALBANY AIR NEWS

By H. F. Wood

THE close of the 1929 legislature saw the successful enactment of the entire legislative program presented by the New York State Aviation Commission, headed by Senator J. Griswold Webb. The aviation commission was the only state group whose program met no opposition.

Six bills made up the program. Among the major measures was one providing for the establishment of fourteen new weather observation stations on present and projected state airways, and appropriating $40,000 for this purpose.

With a view toward creating more airports in the state, bills were passed enabling counties and third class cities to appropriate funds for this purpose and permitting two or more cities to combine in establishing and maintaining an airport.

Another bill provided that the owner or operator of an airport, either municipal or private, cannot be held liable for accidents during landings or take-offs unless gross negligence or carelessness on the part of the owner or operator is established. The sixth and last bill prohibits the erection of beacons except by the sanction of the commission. This measure is designed to keep state airways clearly charted by beacons.

THE New York Power and Light Corporation is completing contracts for the furnishing of power to airway beacons to be erected in its territory, which extends as far west as Syracuse and as far south as the Columbia-Dutchess county line. West of Syracuse current will be provided by the Buffalo, Niagara and Eastern Company, and south of Columbia county by the Central Hudson Gas and Electric Company.

Bids for the steel towers were received last month in Washington, and the work is to be carried through at all possible speed. The stretch between Buffalo and Cleveland already is lighted.

In the territory of the New York Power and Light Corporation the following beacon locations have been established: Nevis, south of Germantown; Blue Hill, south of Hudson; Columbiaville airport, and Bethlehem, south of Albany.

With allowances being made for beacons at the Albany and Schenectady airports, westerly the following locations have been designated: Scotch Church, south of Pattersonville; Auriesville, west of Fort Hunter; Stone Arabia, near Hudson; Little Falls airport; Herkimer, Smith Hill, Utica airport; Vernon, near Clinton and Canastota.

COASTAL AIRWAYS, INC., of New York City, has completed arrangements with Albany city officials to use Riverside Park, fronting the Hudson and only a few minutes removed from the business district, as the Albany terminal for the projected New York-Montreal seaplane service.

Mooring floats are to be installed by the airways concern at the river edge, city officials have been informed.

Binghamton Notes

By John B. G. Babcock

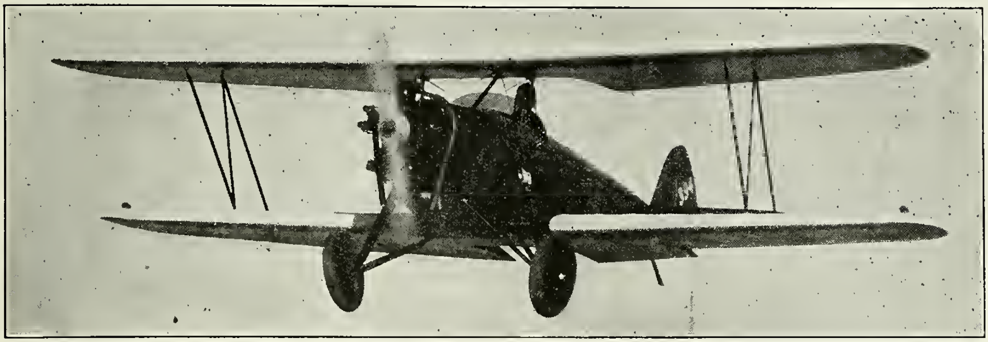
THREE flying schools are to be conducted in this locality this season, according to statements of those in charge. These schools will be at Bennett Field, this city, where Richard L. Bennett will give instruction as for the last several years; at the West Endicott Field, 10 miles west of Binghamton, with Edwin A. Link and Al Stanley in charge of instruction; and at the Norwich airport, 40 miles north of this city, where the Central New York Airways, Inc., will conduct a school, with Don R. Beardslee in charge.

GENERAL JOHN F. O'RYAN, president of Colonial Western Airways, Inc., was to inspect the local landing field owned by Endicott-Johnson Corporation, shoe manufacturers, late in April, according to George W. Johnson, vice president of the shoe concern. Johnson conferred with Colonial Airways representatives last fall regarding use of the area by the latter concern as the chief stop on Colonial's prospective new direct route from New York to Buffalo.

Use of the local field, comprising about 100 acres, will be available to Colonial Western Airways if desired for this route, says Mr Johnson.

The field is now being used by the Endicott Aero Club.

The Arrow Sport



The Talk of the Show

A few weeks ago we announced that the Arrow Sport, powered with 90 H.P. Le Blond engine, would be displayed at the Detroit All-American Aircraft Show.

The talk of the Show . . . . . That is the consensus of opinion. Nationally known pilots were astounded at the wonderful performance of this remarkable ship. Distributors placed orders for 131 ships during the first four days of the Show.

Such a reception must be deserved.

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Flyaway, Havelock, Neb.

Arrow Aircraft and Motors Corporation

Havelock, Nebraska

BUFFALO AIR NEWS

By Walter J. Mahoney

A MEMORIAL is to be erected in the foyer of the local consistory in memory of the late Edwin M. Ronne, former director of the Buffalo Airport. This memorial was donated by employees at the local port, the Irving Air Chute Co., the Curtiss Aeroplane and Motor Co., members of the Ronne Flying Club, and the local chamber of commerce.

TWO Buffalo men have compiled courses in ground school instruction. Michael Steffen, vice president of the Aero Club of Buffalo, has compiled a course which will be presented to pupils of the local branch of the Curtiss Flying Service. Steffen will conduct classes in person.

C. E. Dunham is the originator of the Dunham Ground School Course in Aviation. This course will be an exclusive feature of the ground school of the Buffalo Flying Service. Mr. Dunham is the designer of the Dunham monoplane, which will be placed in production within the year.

REMODELING of the administration building at the local municipal field will begin within the next month. With the assurance that Buffalo will be named a port of entry, space will be provided for immigration offices and waiting rooms. The remodeled building will also include a post office, control tower and a weather bureau.

ACTIVITY at the local municipal port should reach unprecedented proportions this summer. This statement may be proved by a comparison of the companies operating at the field last year and those operating this year.

Last year the following companies operated from the field: Curtiss Aeroplane and Motor Co., Buffalo Flying Service, General Airplanes Corp., and Consolidated Aircraft Corp.

This summer all the above companies, except Consolidated, will be operating and in addition National Flying Schools, Inc., Curtiss Flying Service, Wright and Esenwein, Sky View Lines, Inc., and the Colonial Flying Service.

NATIONAL FLYING SCHOOLS, INC., has started operations at the Consolidated airport in Buffalo. This is the first of a nation-wide chain of flying schools throughout the country. Lieut. Leigh Wade is vice president of the company and is in charge of all operations.

Flight instruction in Buffalo will be in charge of Lieut. Hez McClellan. Fleet biplanes will be used in all the schools throughout the country.

THE Elias Aircraft and Manufacturing Corporation was organized recently to acquire the properties of G. Elias and Bros., Inc., which has been in business in Buffalo since 1881. The re-incorporation of the company was effected to provide for the expansion of the airplane branch of the business. The management of the concern will not be changed.

CENTRAL NEW YORK

By Mildred Marvin

C. H. BENNUM has accepted appointment as sales and business manager for the Central New York branch of the Curtiss Flying Service, Inc. Mr. Bennum was an instructor at Kelly Field and later chief instructor at Taylor Field during the World War.

CONTRACTS for construction of a $60,000 hangar at Amboy (Syracuse) Municipal Airport have been signed by officials of General Aviation Company. The hangar will be constructed by the Truscon Steel Company of Youngstown, Ohio. Contracts call for a steel hangar 120 feet square with 20-foot lean-to on each side. The building will be equipped with sliding doors on each end.

The hangar will have a concrete floor and will be built with complete plumbing equipment. The lean-to will house offices, including a private office for the chief pilot and operations manager, classrooms for the ground school, locker rooms for student pilots and a parts department for Wright engine parts.

EMIL ROTH, JR., vice president and manager of Empire Air Transport, Inc., has announced plans for a pilots' clubhouse to be constructed at the municipal airport at Amboy (Syracuse). The building will adjoin the company's hangar on the property recently purchased across the road to the south of the airport.

The new building, to be known as the Empire Pilots' Club, will be constructed immediately. It will accommodate 50 to 75 persons, offices of the Empire company and several sleeping rooms. It will be large enough to accommodate company officers and pilots and will be open to all pilots at the airport as a meeting place. The building will be of wood construction and will have a large inclosed porch extending all the way around the building.

The Empire Air Transport, Inc., new $50,000 hangar is nearly completed. It is expected that the company's formal opening will be held on May 25.

CHARLES C. TOWNSEND of Pensacola, Fla., a junior Navy air pilot and a well-known mechanic in the Naval air services, will enter the commercial field in Syracuse as chief instructor with the Hogan-Mayer Airplane Company in Wolf Street.

MRS. LOIS MULL, wife of Lieut. H. R. Mull, chief instructor for General Aviation Company, has accepted the position of field office manager for the same company at the Amboy-Syracuse Municipal Airport.

WORD has also been received that the Colonial Flying Schools and Botsford Flying Service, Inc., of Utica, had merged with Colonial.

Dick Botsford and Charles L. Wethern, two well-known pilots, are associated with Botsford Flying Service.

HAGERSTOWN NEWS

By John G. Middlekauff

THE Fairchild Airplane Mfg. Corp. has obtained controlling interest in the Kreider-Reisner Aircraft Corp. Under this merger, production has been increased and 600 planes will be produced this year. The first unit of the new plant has been started and it is expected to be put into operation by July 1st. The line production method will be used and only one model will be produced in this unit. The present units will take care of various other models. Mr. A. B. Harris has joined the Kreider-Reisner staff as sales manager.

The following new models are in production: the C-7 a two-place ship with a Kinner engine and the C-8 a three-place plane with the Wright J-6. The latest model, the C-6 was on display at the show at Detroit. It is a two-place, tapered wing ship with a Warner Scarab engine. Although it has not been given its official test, its top speed is over 140 miles per hour and climbs about 1,500 feet per minute. It is built something like a pursuit ship and was designed for speed, sport and training.

THE Challenger Aviation Club will erect a large air marker downtown within the next few weeks. Aviators flying over Hagerstown at night will be able to locate it by means of the red Neon sign on top of the Hotel Alexander. The sign is about 15 feet high and 75 feet long.

AT the next meeting of the city council, an ordinance regulating air commerce over the city will be passed. Leading newspapers and authorities are advocating the bill.

THE State of Maryland recently passed a bill which will create a $1,500,000 airport. The location has not been selected as yet.

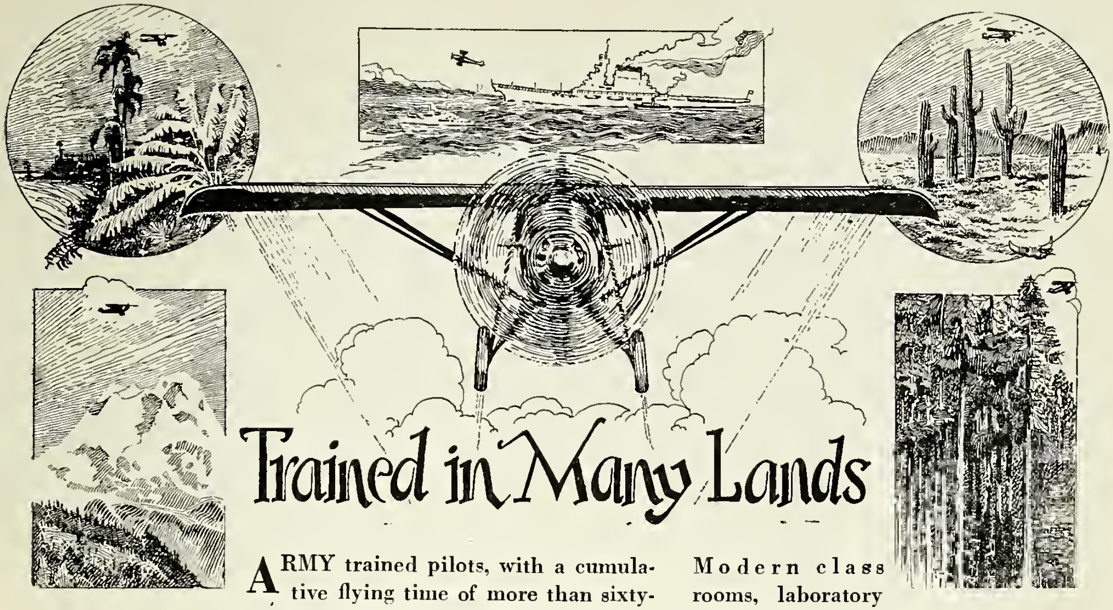
THE Challenger Flying School is doing a rushing business. Simmon Clopper, teacher at the Hagerstown High School, is teaching navigation and meteorology at the school. The field is ideally situated and can handle any type ship. At the present a large force of men is engaged in cleaning up the field for summer flying.

PLANS for the air meet to be held at Hagerstown, May 18 to 21 are going ahead steadily and everything points to a successful meet.

DELAWARE AIR NEWS

THE new building extensions of the Bellanca factory at New Castle, Delaware, were completed recently. These new extensions have made possible an output of twelve Bellanca CH-300 cabin planes during April as against six per month during the first three months of this year, and this production will be progressively increased to one ship per day.

Representatives of the Bellanca company expressed themselves as highly satisfied with the new Wright J-6 engine with which the Bellanca planes are now fitted.



Trained in Many Lands

ARMY trained pilots, with a cumulative flying time of more than sixty-five years, during which time they have flown hundreds of thousands of miles, in many lands, and at sea, with the giant aircraft carriers of the United States Navy, constitute the faculty of the Graham School of Flying.

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Recently, in keeping with the spirit of progress that has always characterized this school, a new and modern downtown school has been opened . . . the first in the southwest.

Only new and modern planes . . . Consolidated Huskies, American Eagle, Monocoupe, Travel Air and Wacos are in use for student instruction. Open craft and cabin planes to insure all around training.

Modern class rooms, laboratory and shop provide a thoroughly modern institution for instruction in the non-flying branches of the industry, preparing thousands for the highly remunerative positions as designers, engineers, mechanics, traffic managers and executives.

Associated with the Graham Schools are not alone men of singular abilities for assimilating and imparting knowledge, but men with a sympathetic understanding of student problems. Every student of the Graham School of Flying is an integral part of the institution. Our concern is, not alone to develop the student's ability, but also to qualify and extend to them the fellowship of flying.

Therefore, in response to a definite demand for Graham training and Graham methods, a great school, after more than twelve years' successful operation, now enlarges and bids for further national recognition.

For your information and enjoyment, an attractive booklet has been prepared. May we mail you your copy? Fill out and mail the coupon TODAY.

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AD-1

ST. LOUIS AIR NEWS

By A. W. League

THE Wright Aeronautical Corporation of Paterson, New Jersey, has closed negotiations to lease a factory in St. Louis for the assembly of Gipsy engines. The factory building is a three-story building of fireproof construction containing approximately 38,000 square feet, and the yard surrounding the plant contains about 32,000 square feet. Work of equipping the plant will be started immediately under direction of W. K. Swigert, factory manager. The Wright concern plans to start operation in the new plant by July 1st.

A BILL proposing the establishing of a comprehensive code of laws governing the operation of aircraft over the State of Missouri, prepared by the legislative committee of the Chamber of Commerce air board, has been formally introduced in the State legislature by Representative Miller of St. Louis. The proposed measure provides for the appointment, by the Governor. of a Commission of Aviation and an Advisory Board consisting of five members. The bill also provides for the licensing of pilots and the registering of aircraft, and establishes rules and regulations for the training and instruction of students, in accordance with Federal laws and regulations.

LAMBERT FIELD, recently acquired by the City of St. Louis through a $2,000,000 bond issue, is to be controlled by a permanent airport commission which will have charge of the development and supervision of the field. The commission shall consist of ten members appointed by the mayor. The operative personnel of the field will be composed of a superintendent, an assistant superintendent, clerk, stenographer, janitors and laborers.

Aerial approaches to Lambert Field are being cleared of trees which, with the increasing student and night flying programs, formed a hazard.

A MARKED increase in the student enrollment rate that began during the middle of March has brought the total of Parks Air College students to more than 600. The Parks Air College school of airplane and engine mechanics now has a total of 290 students. In the flying classes there is a total of approximately 325 students representing 46 states of the Union.

The new three-story brick dormitory for Parks Air College students has been completed and is ready for occupancy. Since a continuous enrollment of 600 students is expected, an addition to the dormitory will be started in several months in an effort to provide housing at the airport for all students.

The new airplane and engine mechanics school building of the Parks Air College is nearing completion. The new building will be of brick and steel construction and is designed along the same lines as the factory of the Parks Aircraft. The school will be equipped with all machinery necessary to build airplanes, and will also be equipped with all the modern airplane power plants.

The new dope and paint shop of the Parks Aircraft, which is the third new structure to be constructed on the Parks Airport in the last two months, has been completed and is now in use.

Lieut. J. F. Fisher has been appointed chief ground school instructor of the Parks Air College. Lieut. Fisher also conducts a night course in aviation at Washington University. George B. Manning has been added to the corps of ground school instructors at the Parks Air College. He will have charge of the course in rigging. Four new flying instructors have also been added to the staff of the Parks Air College. They are: Harvey Gas, Maurice Foley, George Roberts and Stanford Roper.

A HUGE silver cup, emblematic of the commercial airplane speed championship, has been added to the $10,000 in cash prizes posted by Russell E. Gardner, Jr., and Fred W. Gardner, for the Gardner Annual Trophy Race to be held at the Parks Airport May 28th to 30th. The name of each year's winner will be inscribed on the trophy and it will be permanently awarded to the pilot who wins it three times.

Free gas and oil will be furnished to contestants in the Gardner Annual Trophy Race. The Naturaline Company of America has agreed to furnish motor fuel, and the Kendall Refining Company will furnish lubricating oil.

THE St. Louis-Kansas City-Omaha mail and passenger service will be placed in operation on May 1st with a daily service. The new service will give twenty-three hour service between St. Louis and the Pacific Coast, the rail time being about seventy hours.

THE Robertson Aircraft Corporation has been appointed distributor for Travel Air planes in Southern Illinois, all of Missouri with the exception of a few counties in the vicinity of Springfield and Joplin, and part of the State of Kansas adjacent to Kansas City.

Moonlight sightseeing trips over St. Louis and St. Louis County are being conducted every Sunday evening by the Robertson Aircraft Corporation.

UNIVERSAL AVIATION CORPORATION has announced that it has purchased the Paul R. Braniff Air Lines, with headquarters in Tulsa and Oklahoma City and that the company will be reorganized immediately as the Braniff Airlines, a subsidiary of Universal.

THE number of students at the Robertson Flying School has increased so rapidly that a nine-room addition has been built to the Robertson Hotel in Anglum adjoining Lambert Field. The frame building on the west side of the field that formerly housed the offices of the Robertson Aircraft Corporation has been turned into a classroom for the Robertson Flying School.

A MODERN service station for transient airplanes is being opened at Lambert Field by Frank H. Robertson, former president of the Robertson Aircraft Corporation. Robertson has obtained a lease from the city on the double hangar at the west side of the field and is spending approximately $50,000 reconstructing the building. Concrete floors are being installed and brick walls and sliding doors are being added. Robertson will specialize in refueling and garaging planes, and will also have facilities for minor repairs. He also plans to establish similar stations in other cities.

THE new $15,000 student barracks of the Von Hoffmann Aircraft Corporation is ready for occupancy. Room and board is furnished the students for $8 a week. The barracks includes dormitory, shower baths, recreation room, aeronautical library, piano, phonograph, radio, motion picture projector, etc. Another contract has been let for the construction of a hangar and a lean-to.

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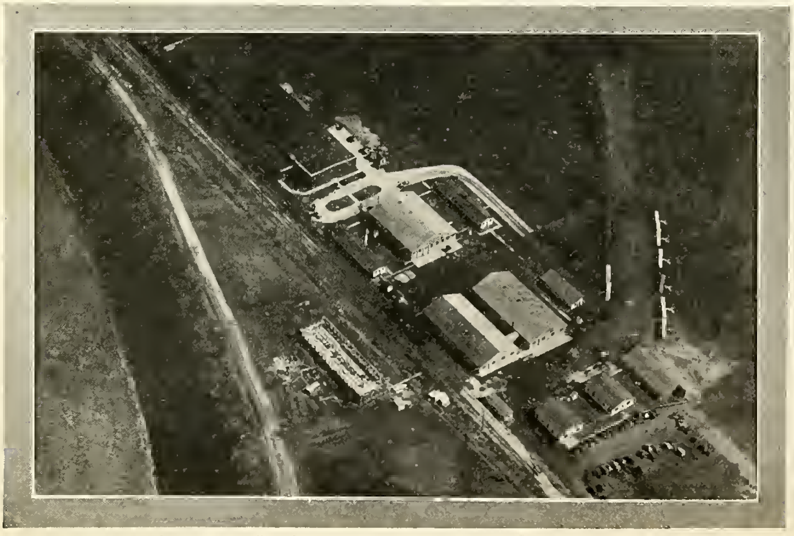
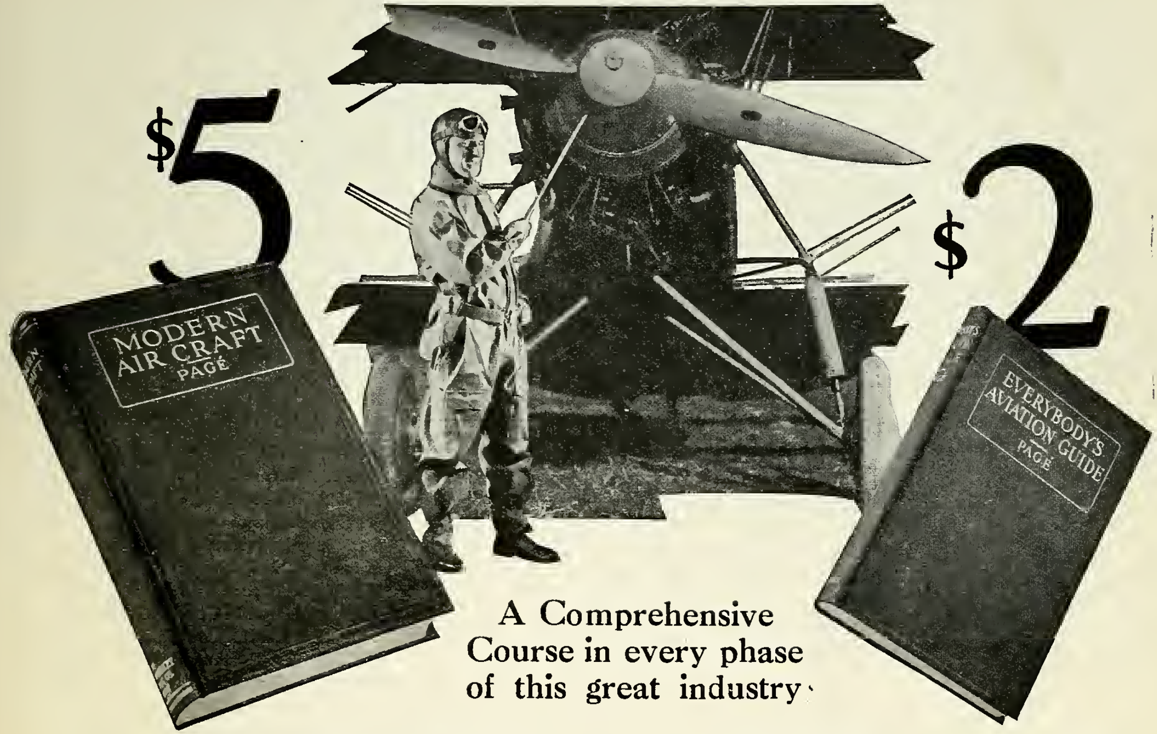


Parks Airport, St. Louis, where the Gardner Cup Races will be held.

An Entire Aviation Course in Two Great Books



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(*St. Louis Air News continued*)

St. Louis Aircraft Show

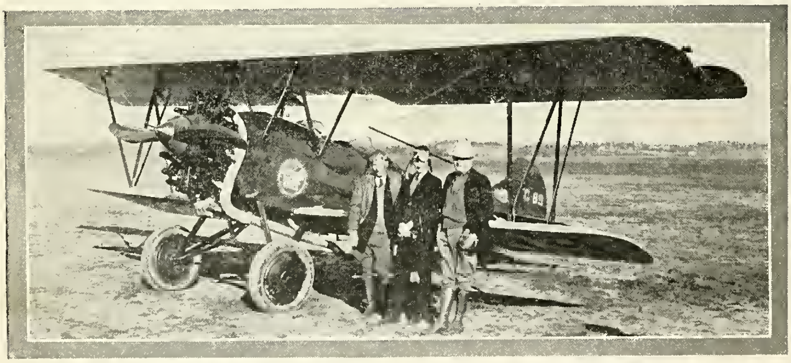
THE first annual St. Louis Aircraft Show will be held in the New Coliseum, St. Louis, May 25 to June 1, simultaneously with the Gardner Cup Races and the National Aeronautic meeting of the American Society of Mechanical Engineers. The show will be held under the auspices of the Jackson Johnson, Jr., Post Number 72 of the American Legion.

A special day at the Aircraft Show has been set aside for the American Society of Mechanical Engineers. Plans have been completed whereby exhibitors may fly their plane entries to the old mail landing field in Forest Park, about four miles from the New Coliseum.

A publicity campaign through the radio, newspapers and other channels has been inaugurated, and special rates are being arranged with the railroads whereby persons from the states of Missouri, Illinois, Kentucky, Indiana, Arkansas, Oklahoma, Iowa, Kansas, Tennessee and Nebraska will be able to come to St. Louis during show week at reduced fares. The show is being directed by H. B. Evans and Thomas C. Magruder.

Most of the well-known airplanes will be represented at the show. Among the first exhibitors to reserve space was the Schlee-Brock Aircraft Corporation of Detroit, which will display two Lockheed Vegas. Representing this organization at the show will be William S. Brock and Edward F. Schlee, round-the-world fliers, Frank H. Jerdone and Dwight Davis.

The Spartan Aircraft Company of Tulsa, Okla., will place two models in the show. A special-body Ryan will be displayed by Lt. Casey Lambert of St. Louis. Accessory manufacturers from California to New York have reserved space.



New Travel Air biplane of the Missouri Pacific Lines.

THE Missouri Pacific Railroad's first airplane, a Travel Air biplane, powered with a Wright Whirlwind J-5 engine, was placed in service April 1, having been flown from the Travel Air factory at Wichita, Kans., to St. Louis on that date.

The airplane will be used by Mr. E. H. McReynolds of L. W. Baldwin's staff in his travels on business for the railroad, which total thousands of miles annually. Its purpose is primarily for company business and research work. Lieut. Linton Roberts, former Army flier, has been named chief pilot and aeronautical engineer for the Missouri Pacific.

WILLIAM B. STOUT, president of the Stout Metal Airplane Company of Detroit, talked on "Aviation and Current Sales Practices" before the Mississippi Valley Merchants and Wholesalers Conference at St. Louis, on April 16. He pointed out the many changes that are daily effected in the commercial world by the advent of the airplane carrier, and the part the airplane is taking today in speeding up distribution.

FOUR new planes produced by Parks Aircraft, Inc., took part in the Detroit Show, including a P-4, six-place cabin monoplane, a P-3, four-place monoplane, a P-1 open biplane and a P-2 biplane. Among Parks officials who went to Detroit for the show are Harry P. Mammen, president of Parks Aircraft and Parks Air College; Oliver L. Parks, vice president and general manager; Edgar C. Schmid, and Claude Sterling.

KANSAS CITY AIR NEWS

By H. H. James

A COMBINATION air and bus terminal has been established a block from Kansas City's Union Station by the Ni-Sun Bus and Air Lines. Frank Rowe, division passenger agent of the lines, has announced that arrangements have been made to transport plane passengers to any flying field in the city.

WILLIAM ONG, vice president and general manager of the Beacon Airways of America, has announced his company hereafter will operate a used plane department and that old planes will be taken in on new planes, just as a used car is traded in on a new one.

THE Butler Aircraft Corporation here received Approved Type Certificate No. 135 from the Department of Commerce for the manufacture of its airplane, the Black Hawk.

E. E. Norquist, president of the Butler organization, announced that manufacture of the Black Hawk on a commercial basis would get under way at once. The company has contracted for 25 Wright Whirlwind engines. The planes will be built for the present in the Butler plant in the eastern industrial district of the city, but Mr. Norquist said a new factory would be built near one of the airports when demand for the plane justified the move. The plane, a 3-place biplane, was designed by Waverly Stearman. It has a top speed of well over 120 miles per hour.

RUNWAYS of a new type of asphalt are to be tested by the officials of the Fairfax Airport, the municipal airport and the Standard Oil Company. The latter company, having developed the asphaltic preparation, will furnish the material free for the experiments.

The new asphaltic compound differs from the regular asphalt in that it can be laid directly on the dirt, the only preparation being that of harrowing the ground. The asphalt mixes with the soil and hardens.

Goebel Aviation Company

COL. ARTHUR C. GOEBEL, whose aeronautical feats are world famous, has chosen Kansas City as the "future air capital of the United States"—to use his own words—and has become associated with a group of Kansas City men in establishing the Art Goebel Aviation Company, Inc., with a capital of $200,000. A wide scope of activities is provided for in the charter application. The first step, however, will be the establishing of an aviation school at the Kansas City Municipal Airport.

Associated with Colonel Goebel are: Herbert M. Woolf, Lou E. Holland, J. C. Nichols, E. E. Amick, Thornton Cooke, Conrad H. Mann, Roy Nafziger, E. E. Norquist, president of the Butler Manufacturing Co., and the Butler Aircraft Corporation; Hugh J. Curaan, B. C. Adams, and J. F. Porter.

The company's base will be located at the north end of the municipal airport, but actual flying will be at the airport. Architects have been commissioned to prepare plans for the erection of necessary buildings for the school and to house the administrative activities.

The officers of the company are: Colonel Goebel, president; Lou E. Holland, vice-president; Herbert M. Woolf, vice-president; Thornton Cooke, treasurer; and Wallace J. Ferry, secretary.

THE Porterfield Flying School, Inc., subsidiary of the American Eagle Aircraft Corporation, has reached the highest enrollment in its history. The U. S. Aircraft and Engineering School, another school here teaching the technical side of aeronautics, has reached an enrollment of 60 in a few weeks. Other schools here are reporting record classes with hundreds of inquiries coming in from all sections of the country.

THE Curtiss Flying Service, Inc., has started operations in Kansas City. The first activity was that of aerial sightseeing tours. Curtiss Robins are used for this work. The company's ground school course was laid out by W. F. Gerhardt, Doctor of Science of aeronautical engineering. Classes will be conducted by Capt. Richard Duncan, a World War flier.

(*Continued on next page*)

LEARN TO FLY
◄◄◄ at a PITCAIRN SCHOOL

The Pitcairn method of training pilots is unique. It is based upon Pitcairn experience as manufacturers of airplanes, as air mail contractors and as extensive commercial operators of airplanes, resulting in an intimate knowledge of just what a pilot should be taught to qualify for private flying and general commercial work.

The Pitcairn method of instruction has been so successful that there are now five schools operating in five eastern states. Each school is located on a commercial airport, giving students the advantage of intimate contact with commercial flying operations.

Courses of ten hours, twenty hours and fifty hours are offered, each course being supplementary to the next shorter, allowing a change to longer courses without interruption of study. The courses closely parallel those of military service schools and are conducted all-year-'round. Reasonable board and lodging may be obtained near each field.

Anyone interested in learning to fly should investigate the Pitcairn Schools before making a choice. A booklet giving detailed information on Pitcairn methods of instruction with a synopsis of courses offered, and setting forth the many advantages of the Pitcairn Flying Schools, will be mailed at your request. Write for it today.

Pitcairn Flying Schools are located as follows:—

IN PENNSYLVANIA

Pitcairn Aviation of Pennsylvania, Inc., operators of Pitcairn Field at Willow Grove, just north of Philadelphia. One of the largest commercial flying fields in the East. Training at Pitcairn Field offers the special advantages of close proximity to the Pitcairn aircraft factory at Bryn Athyn, Pa., where all phases of construction may be observed.

IN VIRGINIA

Pitcairn Aviation of Virginia, Inc., operators of Richard E. Byrd Field at Fort Lee, Va., the municipal airport of Richmond. Byrd Field is a regular stop on the New York-Atlanta air mail line. Located seven miles east of Richmond close by Fort Lee station of C. & O. Railroad.

In NORTH CAROLINA

Pitcairn Aviation of North Carolina, Inc., operators of the Greensboro Municipal Airport, at Friendship, ten miles west of Greensboro. A regular stop on the New York-Atlanta air mail line and a center of constant flying activity.

IN SOUTH CAROLINA

Pitcairn Aviation of South Carolina, Inc., operators of the Spartanburg Municipal Airport, three miles southwest of the city. A regular stop on the New York-Atlanta air mail line.

IN GEORGIA

Pitcairn Aviation of Georgia, Inc., operates at Candler Field, the Atlanta Municipal Airport. Located at Hapeville, eight miles south of Atlanta. The terminal of the New York-Atlanta, Atlanta-Miami and other air mail routes.

PITCAIRN AVIATION INC.

LAND TITLE BUILDING, PHILADELPHIA

PITCAIRN AVIATION, INC.
1828 LAND TITLE BLDG.
PHILADELPHIA
Send me the Booklet—"Flight"

*Name*________________________________

*Address*______________________________

(Kansas City Air News continued)

BEACON AIRWAYS OF AMERICA, INC., has purchased a 2½-acre tract adjoining Fairfax Airport and will start the construction of a $90,000 building at once. The building will house the company's present activities, which include a school of aviation, air taxi service, sales and service for several planes including the distributorship here of the American Eagle.

THE Western Air Express, operating on the West Coast, on May 1 will begin a passenger and air express line between Kansas City and Los Angeles. The municipal airport will be the Kansas City base, arrangements for its use having been completed.

THE Universal Aviation Corporation, through Col. Halsey Dunwoody, executive vice president, has signed a contract with the Fairfax Airport Corporation here that will bring another large aviation school to Kansas City.

The company immediately will begin the erection of two buildings at the Fairfax Airport, each 120 by 170 feet. The hangar facilities will provide for the housing of the company's trimotored Fokker planes.

A NEW kind of aviation school has been opened in Kansas City by S. Q. Noel and W. D. Patterson. The school is known as the National Aircraft Welding School. Students will be trained in welding work in connection with the making and repairing of airplanes.

NEW AMERICAN EAGLE AIRCRAFT FACTORY

LINE production is the keynote of the American Eagle Aircraft Corporation's new factory at Fairfax Airport, Kansas City, Kansas. The plant, erected at a cost of more than $150,000 and said to be one of the most complete aircraft manufacturing layouts in the world, has just been placed in full production.

The factory is situated on a five-acre tract adjoining Fairfax Airport, a Woods Brothers development on a dike protected section of the Missouri River levee.

The American Eagle factory is in five units. A two-story fire-proof brick and concrete administration building houses the offices of the excutives, the engineering department and the direct mail advertising department.

The main factory building is 100 by 300 feet and is of modern, daylight type, constructed of steel, brick and concrete. Two metal buildings, 60 by 100 feet, paralleling the main building, are used for painting and doping. The fifth building, also a brick and steel fireproof structure, is used for an experimental laboratory and to house the ground school of the Porterfield Flying school, a subsidiary of the American Eagle company.

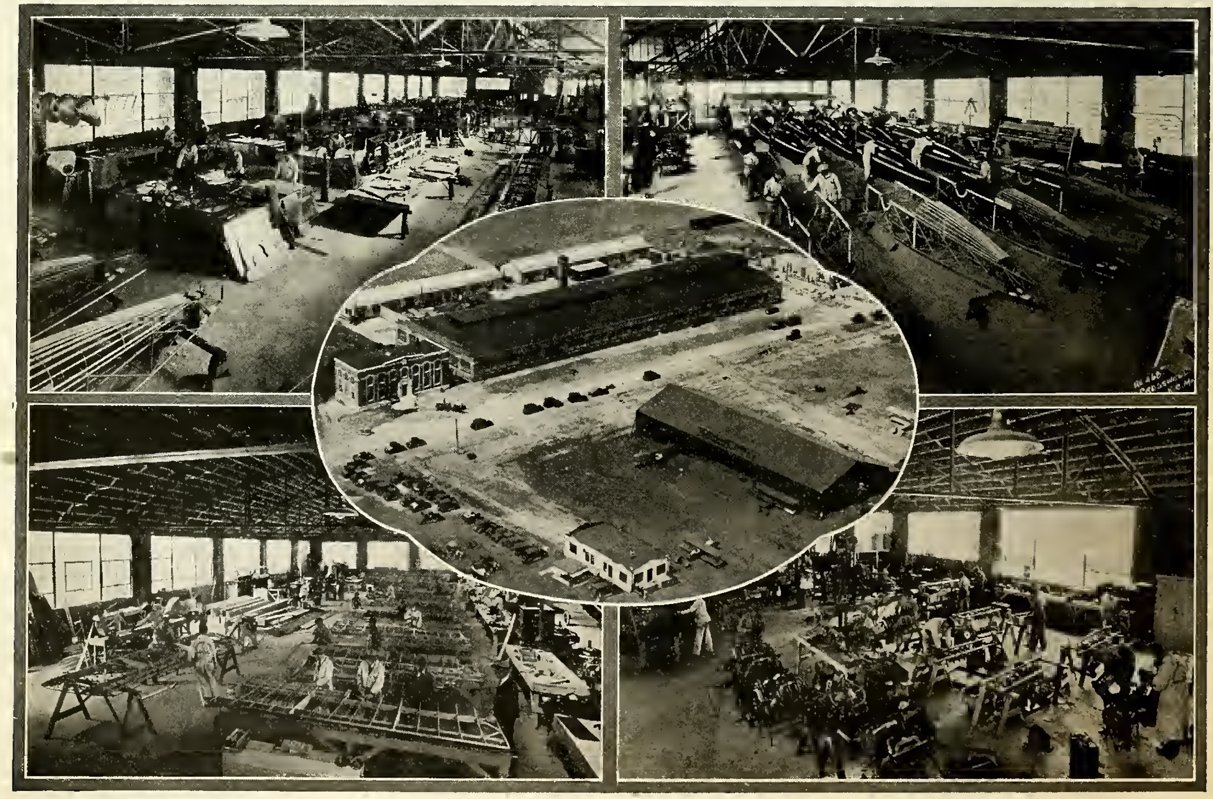
Progress of construction in the main factory building is from south to north, the raw materials going in at one end and the finished airplane coming out at the other, where it may be taxied to the airport and flown away or loaded onto freight or express cars on a siding adjoining the factory on the west.

In the southwest corner of the main building is the stock room, which occupies approximately a sixth of the floor space in the building. A perpetual inventory system enables the stock room director to know at all times what is on hand and what is needed.

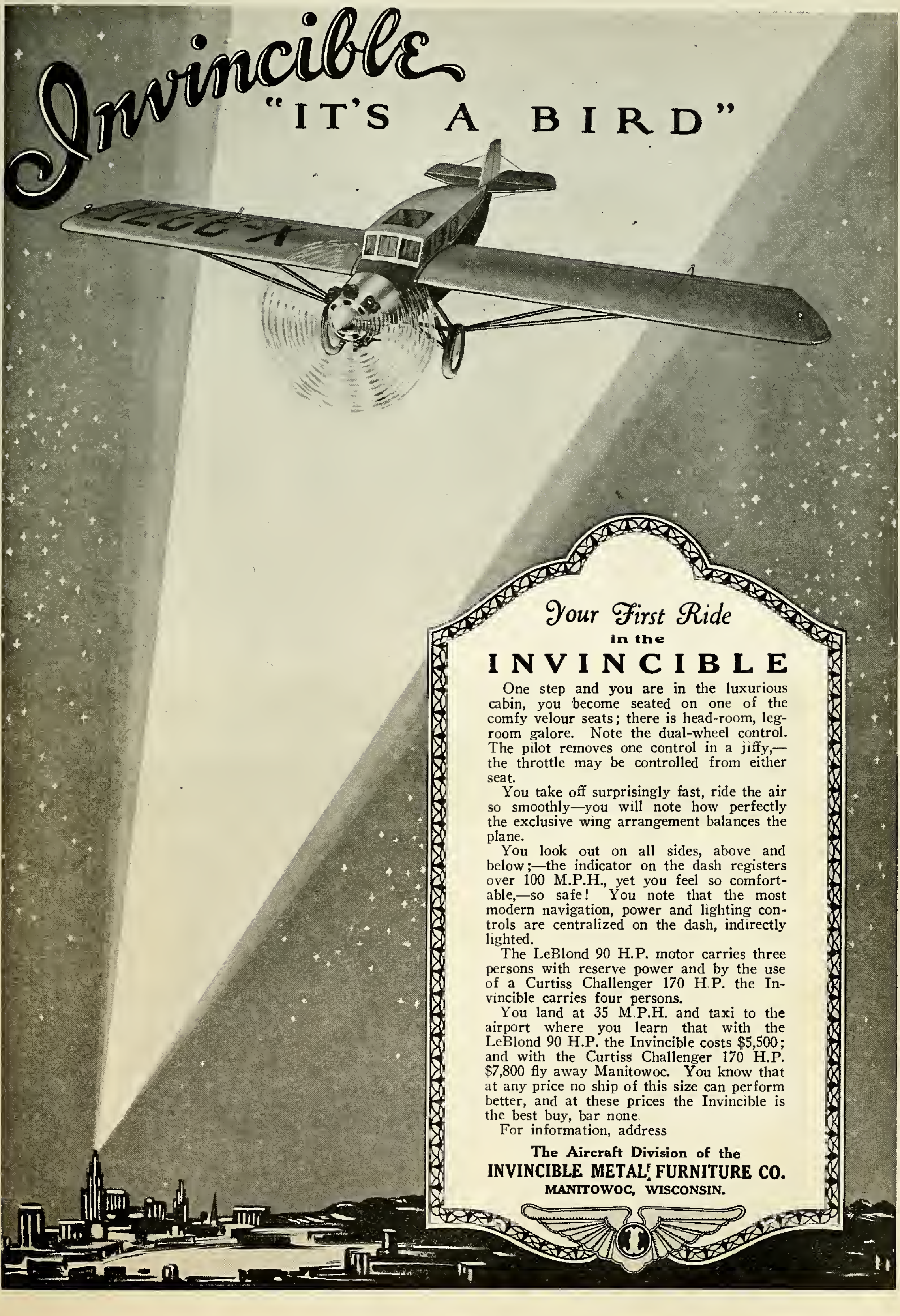
Opposite the stock room on the east side of the building is the welding department. Here, aided by modern devices, fuselages for American Eagle airplanes are assembled and welded. Adjoining the welding department on the north is the metal working department where all of the sheet metal used in the building of American Eagle planes is worked up. Opposite this is the motor department.

At the north end of the building and on the west side is the wing department where more than a score of wing tables are in operation, skilled builders constructing ribs and assembling spars and completing the structures for the coverings which are applied in one of the metal buildings and then doped in the same structure. Painting is done in the north metal building, and the finished wings are racked in storage until needed. The northeast sixth of the main building is used by the assembly department, and it is here that the planes are assembled and completed.

This year's production schedule calls for the building of a minimum of 1,200 planes of the various types produced by the American Eagle company, orders for more than two-thirds of this number now being records on the books of the company.



New American Eagle factory. Upper left: welding department; upper right: assembly line; lower left: wing department; lower right: engine department; inset, center: aerial view of the group of American Eagle buildings at Fairfax Airport.



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INVINCIBLE

One step and you are in the luxurious cabin, you become seated on one of the comfy velour seats; there is head-room, leg-room galore. Note the dual-wheel control. The pilot removes one control in a jiffy,—the throttle may be controlled from either seat.

You take off surprisingly fast, ride the air so smoothly—you will note how perfectly the exclusive wing arrangement balances the plane.

You look out on all sides, above and below;—the indicator on the dash registers over 100 M.P.H., yet you feel so comfortable,—so safe! You note that the most modern navigation, power and lighting controls are centralized on the dash, indirectly lighted.

The LeBlond 90 H.P. motor carries three persons with reserve power and by the use of a Curtiss Challenger 170 H.P. the Invincible carries four persons.

You land at 35 M.P.H. and taxi to the airport where you learn that with the LeBlond 90 H.P. the Invincible costs $5,500; and with the Curtiss Challenger 170 H.P. $7,800 fly away Manitowoc. You know that at any price no ship of this size can perform better, and at these prices the Invincible is the best buy, bar none.

For information, address

The Aircraft Division of the
INVINCIBLE METAL FURNITURE CO.
MANITOWOC, WISCONSIN.

MISSOURI AIR NEWS

THE Bird Wing Commercial Aircraft Company with a ten-acre factory site purchased at the Rosecrans Municipal Airport, St. Joseph, Mo., plans a production schedule of its planes in a new factory by the end of the 1928 season. Water landing facilities and railroad connections are included in the plans of the Bird Wing organization, which has been operating at the Rosecrans field a school, passenger, and manufacturing activities for the past two years. The company also has an option on an additional thirty acres north and east of the other tract.

THE Nicholas-Beazley Airplane Co., Inc., of Marshall, has announced the appointment of John S. Cox and Son, of Terre Haute, Indiana, as distributors for the Barling NB-3 monoplane in the southeastern part of Illinois, southwest Indiana, and northwest Kentucky.

Under the direction of Paul S. Cox, a force of five salesmen will be placed on the road and equipped with airplanes for the exclusive purpose of selling aeronautical parts and supplies and airplanes.

NEGOTIATIONS for the exclusive foreign distribution rights of the Warner Scarab engines, manufactured by the Warner Motor Company of Detroit, and all aeronautical products of the Kendall Oil Company of Bradford, Penn., were completed at the All-American Aircraft Show by W. F. Potter, export manager of the Nicholas-Beazley Airplane Co., Inc.

Foreign distribution for the products of the two concerns will be handled entirely by the export department of the Nicholas-Beazley company through a network of foreign depots.

THE Nicholas-Beazley Airplane Co., Inc., has announced the appointment of Air Activities, Inc., of Chicago, as an authorized Nicholas-Beazley parts and supply depot.

An initial order comprising more than 2,600 items and amounting to approximately $15,000 was recently shipped by Nicholas-Beazley to the newly-organized Chicago concern.

The sales division of Air Activities, Inc., will handle the distribution of the Barling NB-3, produced by the Nicholas-Beazley company. Demonstration work for the plane will be carried on from the flying field.

WICHITA AIR NEWS

Braley in New Building

THE Braley School of Flying, Inc., moved into the first of its new buildings on April 15 at its 313-acre training airport near the municipal field at Wichita, Kansas. The institution will have a floor space of 65,000 square feet when completed.

The new buildings at the Braley field include an administration building, 100 by 150 feet; a dormitory with capacity for 250 students, with individual lockers, showers, lounging and recreation room, cafe facilities, and rooms available for transients; a shop and hangar building 100 by 200 feet; and a factory building 75 by 200 feet. The field is being equipped with floodlights. The school has secured thirty motors for a display of motors and planes of different types for study in the ground school.

WINGS, INC., of Shreveport, La., was recently appointed distributor for Stearman planes in Louisiana, Arkansas and Mississippi, according to an announcement of officials of the Stearman Aircraft Company of Wichita, Kansas.

AIR INDUSTRIES FOUNDRY, INC., has been organized by officials of the Stearman Aircraft Company to produce aluminum and brass castings to meet the requirements of the aëronautical industry. Other aircraft manufacturers will be invited to participate in the ownership of the concern, and general casting work will be added to the foundry activities. A complete pattern shop will be maintained. S. S. Pierce, formerly of the U. S. Aluminum Company, will be manager of the foundry.

THE Swallow Airplane Company recently reported orders for 272 planes on hand with cash deposits. Deliveries for April are estimated at 50 planes.

NINETEEN miles to a gallon of gas was the performance of a Warner-Scarab powered Cassna plane on a nine hour flight made recently by S. T. Stanton, test pilot of the Cessna organization. The Warner Scarab engine used 57 gallons of gasoline on the flight from Wichita to Buffalo with a four place cabin plane.

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at the DONALD WOODWARD AIRPORT
LeRoy, N. Y.

CLASSES are now being formed to accommodate a limited number of students who really want to learn to fly, and who are looking for quality.

Our field is the best equipped private airport in the country, and our fleet of 14 ships enables instruction in several different types, including cabin monoplane, flying boat and large amphibian.

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2 Courses Are Available:

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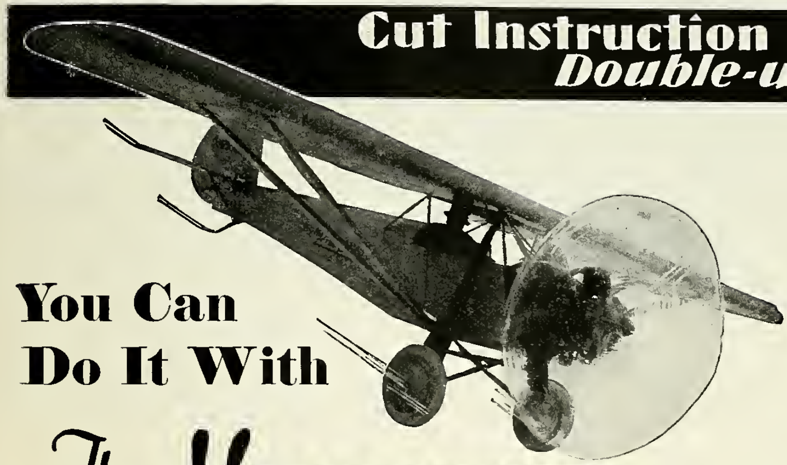

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MAINTENANCE and operating costs of the MONOPREP are but a mere fraction of the expense attached to the average training plane.

That's why schools with Monopreps on the line can offer student training for less money and still enjoy larger profits than their competitors.

Often the same purchase money puts two *Monopreps* instead of a more expensive plane into service, which means two students in the air during the same hour. The side by side training permits the instructor to cover each lesson thoroughly *while the student is in the air.* This feature alone saves hours of time.

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Builders of the Monocoupe, Monocoach and Monoprep
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Note these Monoprep Features—

Perfect vision all directions.
Oildraulic landing gear struts.
Two doors.
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Five hours fuel.
Flyaway price $2675.

Increased Enrollment Accrues to the School with the MONOPREP

AD

IOWA AIR NEWS

By R. W. Moorhead

WITH the Des Moines municipal airport in better condition since the ground has dried, the air mail regularly lands there. Planes have landed at the Des Moines field during the winter only when the field was cleared sufficiently to allow landings.

THE establishment of a north and south passenger airline operating on a daily schedule both ways between Kansas City and Minneapolis-St. Paul, with Des Moines as the operating center, is definitely assured, according to an announcement made here recently by Russell Reel, president of Yellow Cab Airways, Inc. The service will probably start about May 1st.

As flying equipment for the new passenger route, Yellow Cab Airways will use new Fairchild 71 cabin planes. Arrangements are being made for terminal facilities and servicing and for passenger representation at cities on the route. Des Moines, as the central point, will be the operating headquarters.

THE aircraft mechanic license bill which has been introduced in the house of the state legislature provides for a five dollar license fee, with a yearly renewal fee of one dollar. The measure provides that no person shall be issued a license until he has taken an examination and until he has completed at least two years as an apprentice and two years as an advanced apprentice.

The house of the Iowa legislature has passed the aeronautics bill by a vote of 75 to 11, after adopting an amendment providing that cities with a population of 30,000 or more can vote whether or not they wish to be taxed for an airport. The chief objection to the amendment was that a special election would cost from $6,000 to $10,000—money that might go towards construction of the field. The measure, which passed the state senate without this provision, will be returned for consideration of the amendment.

The measure further provides that cities and towns shall have the right to improve and maintain these airports and may issue bonds in payment of the cost, payment of the bonds to come from the tax.

EXPANSION of the aviation school operated at the municipal field by Yellow Cab Airways, Inc., in courses, personnel and equipment, so as to build up an all-season school, has been announced by Russell Reel, president of the company. The courses at the Yellow Cab Airways school will be divided into a ground school division and the flying division. To manage the ground school division, H. Fletcher Brown, an experienced engineer, has been engaged. Fritz Rieger, a licensed airplane motor mechanic, will give the motor instruction.

Two ground school courses will be offered—one of six weeks and one of twelve. Navigation and meteorology will be taught, as will also airplane and motor inspection, repairing, etc. Tom Craig, a veteran transport pilot who has operated a flying school of his own, will be chief pilot in charge of the flying school. Lieut. Glen Neal, formerly of the Army Air Service, and Floyd Davis, will be instructors.

Flight training will start on new production biplanes equipped for training purposes, with speaking tubes and other devices. For later training, the company plans to use new Fairchild low-wing training monoplanes, several of which have recently been ordered by the company. All of the school work in both the ground and flying divisions will be given at the municipal airport.

L. B. Maytag, Newton, Iowa, and L. F. Wheelock, Des Moines, have been elected to the directory board of the Yellow Cab Airways, Inc.

THE Cruizaire, first plane to be built at Clarinda, Iowa, has just had a successful trial flight. Jack Beitman was pilot of the new ship, which is owned by the Southern Iowa Airways. The Cruizaire is a monoplane with five-cylinder radial engine. It will carry three passengers besides the pilot.

THE incorporation of the Southern Iowa Airways, Inc., has been formally announced at Bedford, Iowa. The general business of the company is to own, lease, maintain and operate airplanes and airships, landing fields, airports, and other equipment.

AT the three-day conference on aeronautics to be held May 27 to 29 by the engineering division of Iowa State College at Ames, Iowa, there will be a program of papers and discussions covering the field of aviation. A limited amount of free exhibition space will be available.

AIRCRAFT SECURITIES

THIS organization is made up of men who have been engaged in the aircraft and aircraft securities field for years.

It is new in spirit but adheres closely to those time tested standards of investment banking, underwriting and securities selling that are recognized as standard in the profession.

This organization offers to the industry a comprehensive understanding of its problems, a market for its securities and the advice and co-operation of seasoned executives.

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Inquiries are invited.

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Every day—every minute—that you delay means that other men are getting in ahead of you; men who are going to compete with you for the big positions in this new industry. Students are flocking into Guardian from every state in the Union. There is a place here for you, but you must act fast. Get the coupon off now. We have a special offer for a limited number of early signers. Let's go!

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Please send me a copy of your latest book, "Heavens filled with Commerce."

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MINNESOTA AIR NEWS

By Lyle F. Youngstrom

UNIVERSAL AIR LINES discontinued service over the Chicago-Twin Cities route Tuesday, April 16, on consideration that it be given the opportunity to purchase a minority interest in the Northwest Airways, Inc., which operates over the same route and which has the air mail contract.

Operating officials of Northwest Airways do not expect to renew the air passenger services between the Twin Cities and Fargo or to Duluth, which Universal launched last fall and discontinued later in the year.

The recently reduced scale of airplane fares between Chicago and the Twin Cities will not be raised. According to Northwest Airways officials, the reduced fares established April 1 by the company resulted in the doubling of the passenger business.

T. G. Williams, general manager of the northwest division of Universal Airlines, announced that his company will confine activities in the Northwest to the development of its aviation schools at St. Paul, Minneapolis, and Rochester, Minnesota, and to the expansion of the sales organization covering aircraft and parts. An aerial photographic department has been organized and will be developed to make maps and aerial surveys.

THREE bills which pertain to aviation are before the Minnesota legislature. Two of them regulate air traffic, and the third authorizes towns, villages, and counties to establish and operate airports. They provide that no civil aircraft can be operated commercially in Minnesota unless it is licensed under Federal regulations.

The second bill sets up a uniform liability act, defining liability of owners, pilots, and property owners. Owners of aircraft would be held liable for injuries to persons or property caused by ascent, descent or flight by aircraft.

DURING the month of March there were 465 airplane flights at Wold-Chamberlain Field, total air mileage being 106,469, according to L. D. Hammond, airport manager. Passengers carried during the month totaled 1,740. There are now 65 planes at the field, including 36 of Universal Air Lines, 12 of Northwest Airways, 11 of the 109th Aero Squadron, four of the Naval reserve and two parked on the field.

DULUTH AIR NEWS

By Arthur G. Patterson

CONSTRUCTION work on Duluth's 640-acre municipal airport is now under way, with the clearing and burning of 15 acres of stumps and brush as the first work to be completed. According to present plans, the municipal airport when completed will have eight runways. Only four, however, will be completed and in operation this year. At least one hangar will be completed this year. Construction work at the airport is under the supervision of City Engineer John Wilson. Work completed to date includes plotting of the area, obtaining levels of the field, preparation of topographical maps, study of wind and fog conditions and laying out of runways. Fog at the site averages 2.4 hours a day, with the longest period at 5 a. m. and the shortest at 2 p. m. and midnight.

A NEW private airport to be constructed within the city limits of Duluth has been announced by Joseph E. Vercelline of Duluth, owner of the tract on which the airport will be located. The land comprises 160 acres, about five miles from the main Duluth post office on a paved highway. It may be reached by automobile, bus, railroad and boat and is to be used for both land and seaplanes. Construction work on two runways and hangar facilities is to be started in the near future. An aviation school is to be conducted at the airport. Cabin airplanes and amphibians are to be operated in taxi service and for trips to Chicago, Milwaukee, St. Paul and Minneapolis. The corporation which will establish the aviation school and operate both the airport and the planes for commercial use is incorporated as the Lakewood Golf Club, Inc.

AN ordinance calling for the formation of a municipal airport commission to control the Duluth municipal airport has been introduced by Mayor S. F. Snively of Duluth. The airport commission will be given the power to appoint and employ, subject to approval of the city council, an airport manager and several assistants as needed in

(Continued on next page)

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For *every* type of plane

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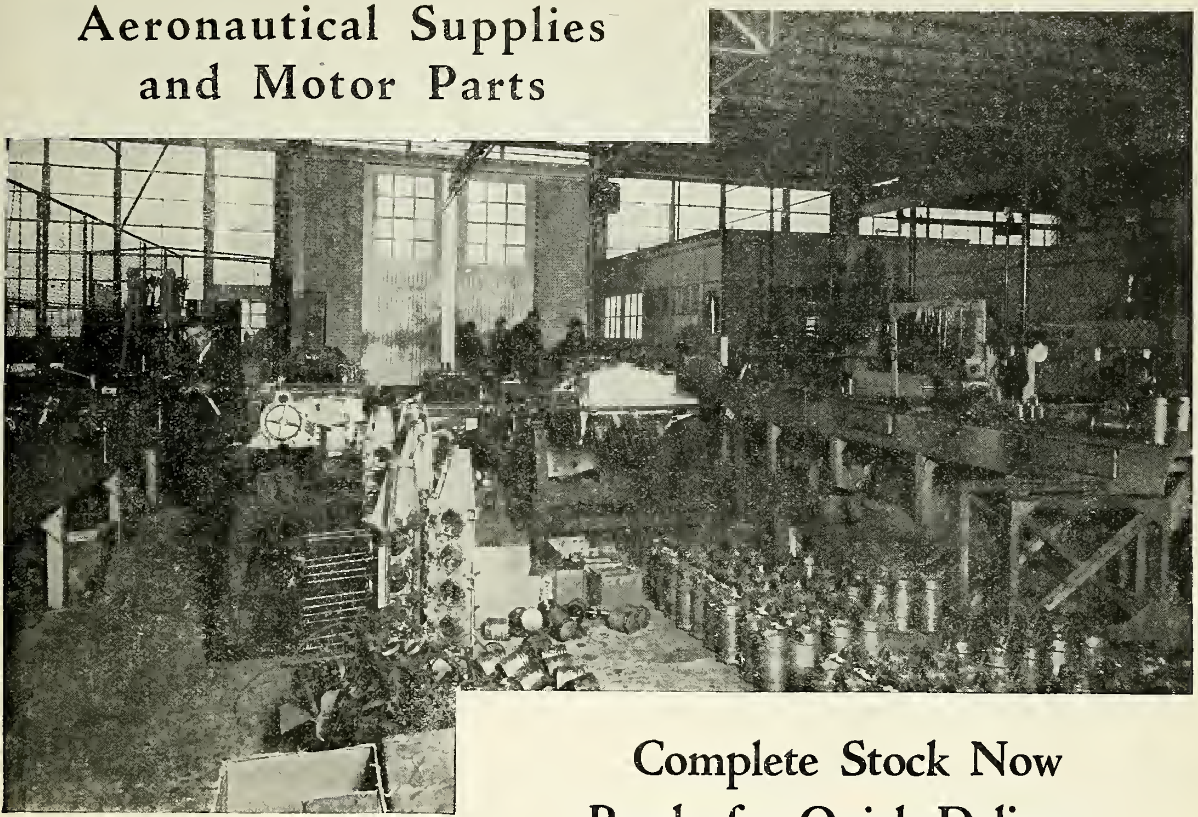

Showing the OX-5 Assembly Plant of the Robertson Aircraft Corporation. Here is the largest stock of OX-5 parts in the United States.

All sizes wheel discs die stamped and accurate. Size 26 x 4, $3.00 pr.

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Navigation Lights, regulation style, $15.00 set.

Spinner caps, accurately turned and finely finished, most sizes, $2.00.

Tubing, streamline and round.

Any and every aviation need promptly shipped.

Authorized Wright Parts Dealer with parts for Whirlwind motor in stock.

The new Parts Catalog is complete, representative and honestly helpful. Write for your copy.

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Robertson dependability has long been known throughout the aviation industry. Robertson never substitutes. All parts are strictly standard or made to AN specifications. Every item is guaranteed.

Now, with the enormous purchasing facilities afforded through merging with the Universal Aviation Corporation, Robertson has been able to buy in quantities that permits the offering of a complete stock of aviation supplies at lowest prices obtainable.

Robertson dependability, Robertson promptness in making deliveries and Robertson low prices afford the aviation industry a service which has long been needed. A new catalog is just coming off the press and will be sent you on request. Write for your copy today.

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For quick service phone Avery 2725

DIVISION UNIVERSAL AVIATION CORPORATION

N470

(*Duluth Air News continued*)

the operation of the airport. The ordinance provides that no person shall use the municipal airport as a base or terminal for commercial aviation, or the carrying of passengers, freight, express, student flying, communications or other commercial purposes or transportation, without first securing the permission of the airport board and paying the fee and charges prescribed.

OPERATION of a new airline out of Duluth is expected to start soon, according to an announcement made by Louis P. Hogstad of Duluth. The new line will operate between Duluth, Superior, Grand Marais and Isle Royale, Michigan. A fourteen-passenger amphibian plane, using the Duluth-Superior harbor, the bay at Grand Marais and several harbors at Isle Royale as landing places, is to be used operating on a schedule of two round trips daily.

NORTHWEST AIRWAYS MODEL PLANES

By Ruby R. Clark

IN his spare time, Walter Bullock, senior pilot of Northwest Airways, made model airplanes. For him it was only sport, this work of taking little pieces of metal and wood and fashioning them into replicas of the big ships he flew. He was working on three ships all partially completed. Other fliers, admiring his work, suggested that the little models should be exhibited at the Aircraft Show in Detroit.

Because busy pilots do not have much time to devote to their hobbies, Bullock was forced to permit fellow workers of the Northwest Airways to aid him in hurrying the models to completion. Nights, after they had finished their respective tasks of flying and repairing the big ships, the pilots and mechanics of the line went to work on the little craft. The ships were finished and the workers proud of their job. They took pictures of the models and exhibited them to friends. So true to life were the miniatures that persons looking at the pictures believed they were of real planes.

Under a guarding shelter of glass, the models were presented to the thousands of visitors at the Detroit show. Everyone was interested, from the grimy-faced boys, with their helmets dangling from one ear, to the pilots and experts of the business. Crowds thronged around the models. Finally, the officials of the line realized that what had started as a sport and a hobby had grown to a lucrative business. "Let's talk to some of the manufacturers and see what they think about models," was one suggestion.

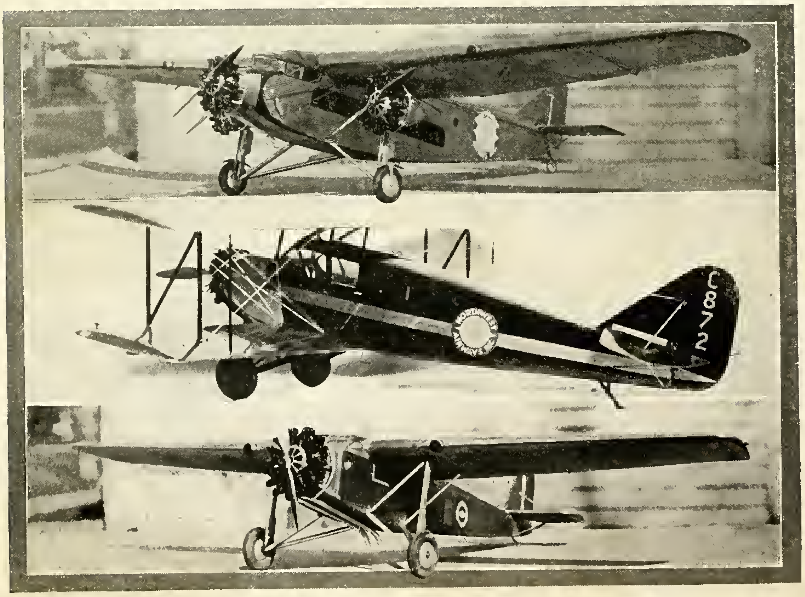
The idea was followed out, and the reaction of the manufacturers was instantaneously favorable. "Here's the idea," said one, known to the industry as a leader in all forms of sales promotion. "We are realizing that the public really decides what kind of equipment the operators will use. We know now that operators must please the public and provide the planes they want. At a flying field in New York recently, I witnessed an evidence of this. One young man, who very definitely knew nothing about aviation, had heard the name of one airplane. To impress the young woman he was escorting, he insisted with the seller of tickets that they should ride only in that certain plane.

"Persons not in the industry are eager for knowledge. They want to know about airplanes, what they are made of, how they perform, what they cost. The manufacturer who educates the public about his plane is going to sell those planes to the operators. Another angle is that a model may be used by sales distributors. It is impracticable and expensive always to show the plane itself. It generally is too bulky, too cumbersome to be exhibited. But the model will do just as well, provided it is properly proportioned, and exact in detail."

Officials of Northwest Airways got their pencils to work. They figured out what the models cost, how they could reduce expenses by building the little ships in larger quantities. Then they produced order blanks and went to work.

Before the show had ended approximately 900 models were ordered. Manufacturers ordered models of new types of planes to send to important distributors. Operators ordered models of the ships on their lines to exhibit in windows. Engine manufacturers ordered models of the planes using their products.

Northwest Airways, as a result, organized a special department to build and sell models. What had started as a sport and a hobby had, in the twinkling of an eye, developed into a business.



Ford, Stinson biplane and Hamilton model planes built by Northwest Airways pilots.

NEBRASKA AIR NEWS

By James R. Lowell

BONDS for the purchase of a municipal airport site were voted by a large majority at the spring election at North Platte. The proposition was sponsored by the junior chamber of commerce.

R. B. STOWELL, former manager for the Standard Oil Co. in Fremont, has been retained as manager of the new Fremont airport.

A HANGAR to house twenty planes is being constructed of baled hay at Fremont by Harry J. W. Hiles. The bales are held together by cement and will be stuccoed both inside and out with cement reinforced with steel rods. The hangar is circular in shape and has a large door on one side. Hiles is president of the United States Aeronautic Academy. Each of his pupils is required to purchase a monoplane, it being stipulated in the contract that the purchaser is to be taught to fly before going to the factory and flying the plane home.

TWO subsidiaries of the Arrow Aircraft & Motor Co. were incorporated during April. The Arrow Airport, Inc., has an authorized capital stock of $450,000, and its articles of incorporation were signed by A. E. Faulkner, vice president and general manager of Woods Bros. Corp.; George J. Woods, vice president of Woods Bros. Corp.; and F. Pace Woods, publicity manager of the Arrow Aircraft and Motor Co. The new company will deal in airplanes, transport passengers and freight, and conduct a school for pilots and mechanics.

The Arrow Sales Co. was incorporated with a capital stock of $25,000 for the purpose of dealing in airplanes and to promote aviation exhibits. The incorporators were Mark Woods, president of Woods Bros. Corp., George J. Woods and F. Pace Woods.

A BILL, which has been receiving favorable consideration in the Nebraska legislature and is expected to be passed soon, requires display of warning lights on aerial towers more than fifty feet high.

(*Continued on next page*)

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(Nebraska Air News continued)

WILLIAM E. ARTHUR, in charge of the airport division of the Austin Co., of Cleveland, has completed a survey of the site for Omaha's new municipal airport.

The advisory committee of the municipal airport has decided to incorporate 200 feet of additional ground with the present field. The tentative plan submitted to the board provides for a line of seven hangars on the south border of the field with courts between. A hard surface runway will be constructed in front.

There is talk in Omaha of improving a neck of Carter Lake, which extends to the new municipal airport, for use as a landing point for amphibian planes. The jump from Lake Michigan and Chicago to Carter Lake would be only three hours.

TWO companies, the Nebraska Travel Air, of Omaha and North Platte, and the Burnham-Miller Flying Service, of Council Bluffs, Iowa, have consolidated to form the Midwest Aviation Corporation. Headquarters will be in Omaha.

Lawrence Enzminger, formerly president of the Nebraska Travel Air, will be president of the board of directors of the new company. A. R. Burnham, who was president of the Burnham-Miller Flying Service, L. D. Miller and C. E. Burnham, will be vice presidents. Stover Deats of North Platte is secretary, and J. W. Lewis of Clarke, Lewis & Co., is treasurer.

The Midwest Aviation will shortly have aero service facilities in Sioux City, Grand Island, Neb., and Des Moines, and within the next 18 months it plans to have not less than 40 of the larger cities and towns in the two states equipped for service.

THE Lincoln Chamber of Commerce has started a campaign among its members to raise $17,000 which, added to $20,000 already available, will be used in boosting Lincoln as an aviation center. There are now two plane manufacturers in Lincoln, the Arrow and the Lincoln-Page, and two flying schools.

The city council of Lincoln has awarded a contract for furnishing $40,000 gallons of asphaltic road oil, to be applied on the runways of the new municipal airport, to Ralph Matteson of Lincoln. The new port will be ready for use some time in May, according to City Engineer Erickson.

South Dakota Aviation Week

By H. A. Lindbergh.

THE greatest series of programs on aviation ever attempted in South Dakota will be held from April 29th to May 4th. Although most of the communities will be holding appropriate meetings and events, the major activities will be concentrated at six of the leading airports.

The schedule of events begins on Monday, April 29th, with the official spring opening of the Rapid City airport; April 30th is the day of the dedication of the Huron airport and the inauguration of the air-rail service furnished through the coöperation of the Rapid Air Lines, Inc., and the Chicago Northwestern Railroad in which train passengers from Omaha and the Twin Cities make connections with the plane bound for Rapid City, saving two full days on a round trip to the Black Hills from the East; May 2nd, official opening and dedication of the Watertown airport.

NORTH DAKOTA NEWS

By A. E. Riggle

LIEUTENANT CARL BEN EIELSON, Hatton, N. D., pilot for Capt. Sir George Hubert Wilkins, returned home recently and spent two weeks with his father, Ole Eielson, at Hatton. Lieutenant Eielson was greeted by his fellow townsmen en masse when he arrived, the schools being dismissed so that children might greet the village's most famous son. The American Legion post members formed a guard of honor to accompany him to his home.

MEMBERS of the Hettinger Commercial Club have taken over the municipal landing field opened a year ago by the American Legion, and are raising money to continue payment of it and for improvements. Initial payment on the land, which was purchased for a landing field, was made by the Legion.

LANGDON, N. D., is planning a combined nine-hole golf course and landing field, a group in the city sponsoring the project. An attempt is being made now to secure a lease on a 160-acre tract of land, which will be divided for the purposes needed. The landing field will be established this spring, if the project goes through.

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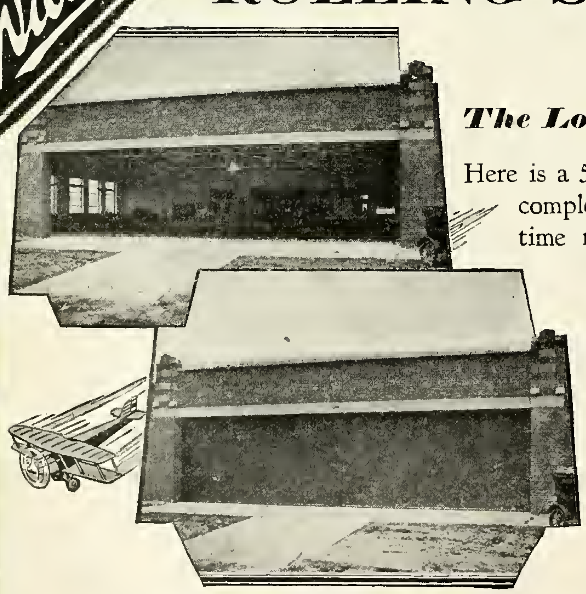

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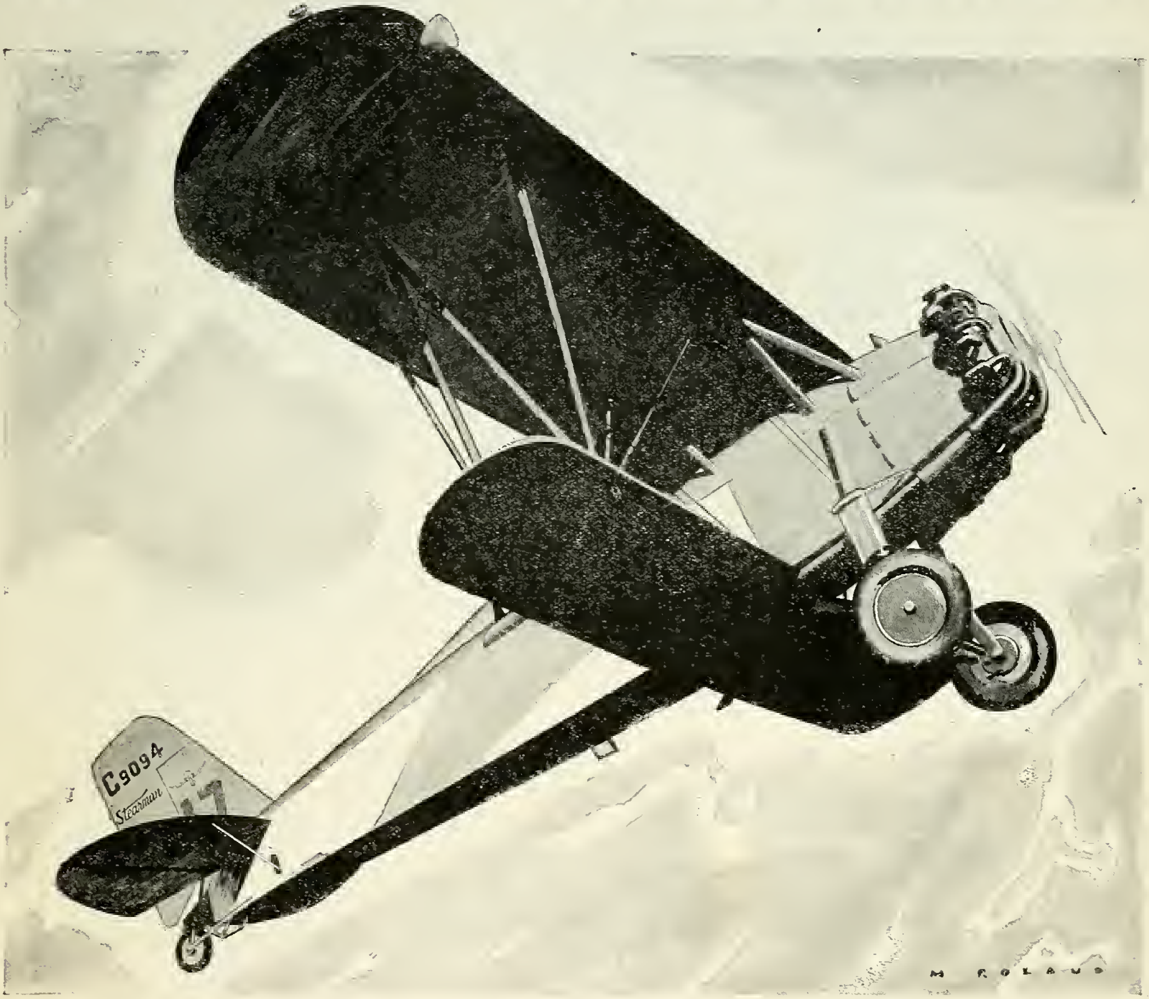

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Grand Forks Notes

By Lloyd C. Tinnes

A SIX-PLANE all-steel hangar has been built at the Grand Forks Municipal Airport, according to George B. Reynolds, president of the Master Aeronautical Corporation, which erected the hangar. A gas filling station with a 550-gallon capacity has also been recently put in at the airport by the Standard Oil Company with John Hofstad in charge. Flying instruction and passenger work is being conducted at the airport by Al Berglund, pilot for Mr. Hofstad.

GEORGE LOWERS, air transport pilot of Des Moines, Iowa, has been hired as chief pilot for the Master Aeronautical Corporation. Mr. Lowers has 2,500 hours of flying to his credit.

PRELIMINARY plans for the Dakotas or northwest air tour were considered at a meeting at Devils Lake, North Dakota, on Monday, April 22. Commercial and aeronautical organizations from various cities of the state were represented.

WISCONSIN AIR NEWS

By William Scollard

TWO airports in Milwaukee may be sufficient at present, but according to Clarence Falk of the association of commerce air service committee, sites for future airports should be procured now. He also advocated widening Maitland Field.

Martin P. Kelly, traffic manager of the Northwest Airways, stated that in order to make the Milwaukee county airport worth while it would be necessary to construct some sort of super-highway in order to speed ground facilities. As it is at present, according to Mr. Kelly, it takes as long to get into the business district from the airport as it does for a plane to fly from Milwaukee to LaCrosse.

As a result of these opinions, the common council recently introduced a resolution advocating the development of Maitland Field. The resolution would instruct the public building committee to confer with the harbor commission and other agencies on improvement of the field or the securing of a better one.

The Milwaukee county board has also offered to erect a hangar at the county airport for the Hamilton Metalplane division of the Boeing Airplane Co.

THE Hamilton Metalplane plant, Milwaukee, has been given an order for a Hamilton standard all-metal eight-passenger cabin plane for use in passenger and mail service between Venice and Rome, Italy.

THE Midwest Airways, Inc., Milwaukee, has been named distributor of Ryan Broughams for Canada. The Milwaukee concern will now establish branch offices throughout Canada. Officers of the company are J. H. Knaup, president; Val Zimmerman, vice president; E. M. Knaup, secretary-treasurer and B. R. Evans, general manager.

A BILL creating a state department of aeronautics under the supervision of the Wisconsin National Guard has been introduced into the state legislature by Assemblyman Harry C. Slater. The bill provides appointment by the governor of a department officer with the rank of major, who shall act as Wisconsin chief of aeronautics. He will be charged with enforcing necessary air regulations, including marking communities for air navigation.

WALTER MINER plans to establish and operate an airport two miles south of Marshfield, on a 40-acre tract of land. Two long runways will be constructed. Later Mr. Miner plans to erect a hangar.

AN aviation committee consisting of George Boteler, William Lovell and Fred Strong, has been named by the Waukesha Association of Commerce and is now investigating prospective sites for an airport for the city.

THE working force of the Esline Company of Oçonomowoc, Wisc., manufacturer of airplane hangars, has been increased to the extent where officials of the concern fear that the new plant will not be large enough to conduct its present business. The company now has contracts for new hangars in Omaha, one large hangar has been started in Grand Forks, N. D., and one in Wilkes-Barre, Penn. A large combination hangar and exhibition building is in the planning for Glendive Mont.

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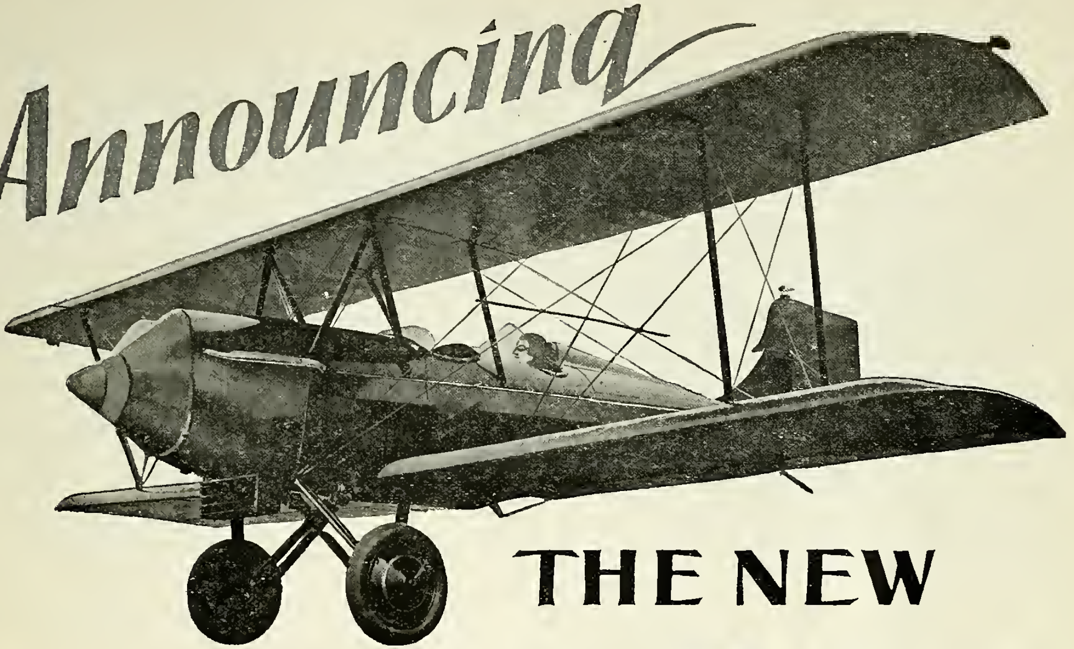

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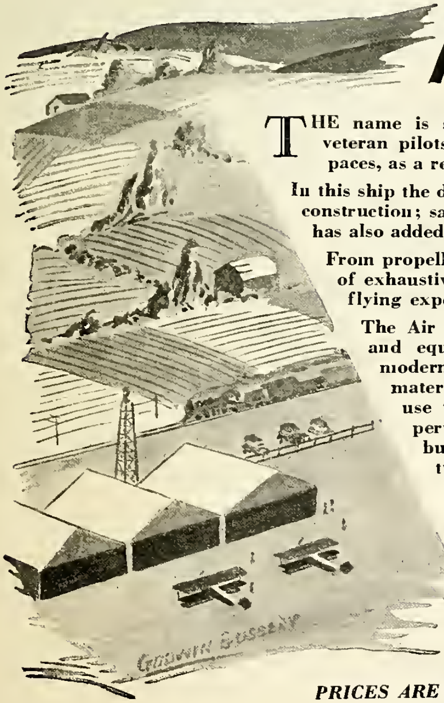

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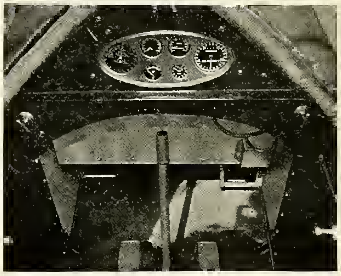

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CHICAGO AIR NEWS

CONSTRUCTION on a fleet of ten quadruple-motor 32-passenger planes for the Universal Aviation Corporation has started in the factory of the Fokker Aircraft Corporation at Hasbrouck Heights, N. J. These planes will be equipped for day flying or night flying, and will be used on the airlines of Universal Aviation Corp.

These planes are equipped with four engines (totaling more than 2,000 horsepower) placed two under each wing, one on each side being tractor type and one pusher type. From this tandem arrangement the plane gets its technical designation—Double Tandem 32. Any two of these engines can carry the plane in safety. The wings have a spread of 98 feet and the body length is 65 feet. The passenger section measures 34 feet in length, nine feet in width. The average height is eight feet. Complete electric lighting, both outside for landing, and inside, is generated by two motor-driven generators. With a full load, the plane carries fuel for 780 miles in 6½ hours, and has a top speed of 145 miles an hour.

Universal Discontinues Chicago-Twin Cities Line

IN conformity to a policy of coöperation among a group of five airline operating companies of the Middle West, Universal Air Lines discontinued its air passenger service between Chicago and the Twin Cities on April 17, leaving Northwest Airways, Inc., the sole operator on that route. This coöperation, according to Harold H. Emmons, president of Northwest Airways, Inc., was reached through an agreement with Stout Air Services, Universal Air Lines, Transcontinental Air Transport, and National Air Transport.

Northwest Airways will restrict its operations to the section west of Chicago and north of the transcontinental airway. It will receive the continued support of six railway systems including the Northern Pacific; Great Northern; Chicago, Milwaukee, St. Paul & Pacific; Pennsylvania Railroad; Baltimore & Ohio and New York Central lines.

THE name of the Chicago Solder Company of Chicago was changed to the Kester Solder Company at a recent meeting of the officers and directors of the firm. The change makes the company name that of the solder produced by the concern.

THE Bloxham Aero Supply Company has received orders for 400 Bloxham Safety Sticks which will be standard equipment on R. S. V. planes built in America by the Gates Aircraft Corp., of New York. The safety stick will also be standard equipment on the Argo built by the Alliance Aircraft Corp., of Alliance, Ohio, and the training ships of the Swallow Aircraft Company, Wichita, Kans., but no definite number of sticks has been ordered by the latter two companies, since they will be requisitioned as needed.

The following companies have been appointed distributors for the Bloxham Safety Stick and the Perfection Helmet; the Beck Distributing Corp., New York, in the East; Robertson Aircraft Corp., of St. Louis, in the Middle West; and Charles L. Henck of Oakland, Calif., on the West Coast.

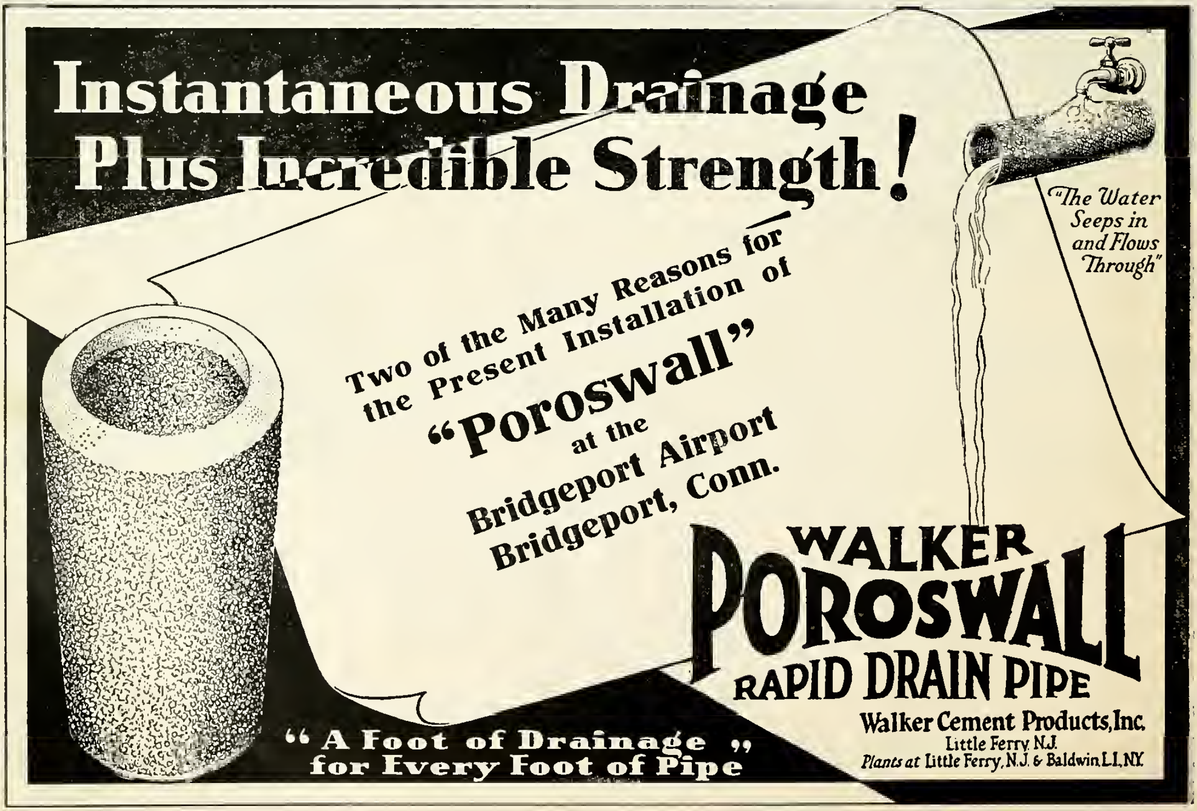
PLANES of National Air Transport, carrier of air mail and express between New York, Cleveland, Chicago, Kansas City, Dallas, and Ft. Worth, flew a total of 525,687 miles with 425,838 pounds of mail during the first three months of 1929. The express poundage totaled 14,193 pounds. 241,780 miles were flown at night.

TILING and preparation of the runways will be completed shortly at the aviation industrial center established by Air Activities, Inc., thirty miles west of Chicago, on the St. Charles highway. A brick hangar 60 by 170 feet, a restaurant and a recreation building are already completed.

The tract includes 825 acres, of which 300 acres are laid out in an L-shaped flying field. This field has 3,000-foot runways in all directions. The site was selected because it is outside of the fog belt, yet within an hour of the loop by highway or by the Chicago, Aurora & Elgin electric line.

This industrial center was designed by Chicago business men to attract some of the aviation manufacturing industry to the Chicago area. The officers of Air Activities, Inc., include Ayres Boal, president; Harry C. Edmonds, vice president; Stuart J. Templeton, secretary; Laird Bell, treasurer; and C. R. Borkland, general manager.

WITH the recent installation of a radio range beacon at Goshen, Ind., the directional radio beacon system from New York to Chicago was completed. National Air Transport flies mail and express over this route, and will equip all planes of its fleet with apparatus necessary to use the radio directive service.



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References:
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From Capt. W. F. Long, Pres.:

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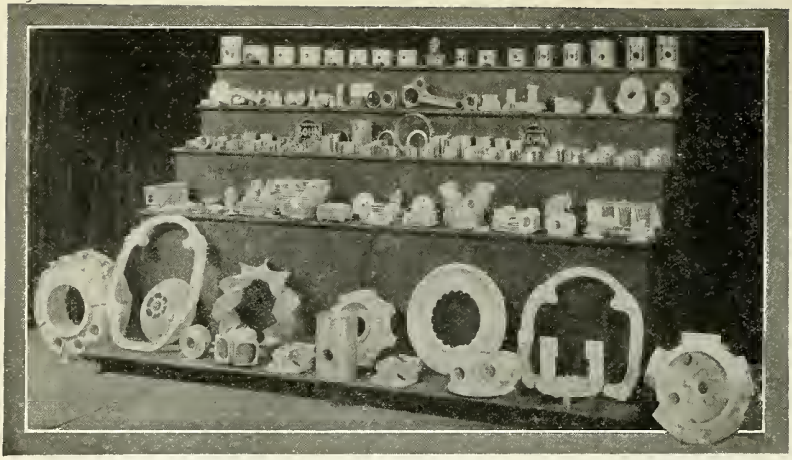

Exhibit of Bohn aluminum and brass parts for aircraft and engines.

DETROIT AIR NEWS

OHIO LOCKHEED SALES CORPORATION of Akron, Ohio, and Randall M. Mitchell, of Columbus, Ohio, have been appointed dealers for Lockheed Vega planes by the Schlee-Brock Aircraft Corporation of Detroit. The Akron territory will embrace all northeastern Ohio, and the Columbus branch will serve southern Ohio.

The Schlee-Brock corporation has announced plans for exhibiting two Lockheed planes at the St. Louis air show to be held May 25-June 1, in the Coliseum of that city. Edward F. Schlee, president, William S. Brock, secretary, and Dwight Davis from the Detroit office of the Schlee-Brock Aircraft Corporation plan to attend the St. Louis show.

IMMEDIATE construction will be started at once on 100 Verville Air Coaches, according to a recent announcement of Alfred V. Verville, designer of the plane and head of the Verville Aircraft Company. Sales made at the Detroit Air Show have required the increased rate of production. The new planes will be powered with any approved American radial air-cooled engine within the horsepower range of 150 to 225.

ANDERSON FLYING SERVICE, which has recently opened offices in the Griswold Building, Detroit, operates a flying school at Parker Field northeast of Detroit on Gratiot Avenue. The service offers private, industrial, commercial, and transport license courses, and operates in conjunction with the Cass Technical School in theoretical courses. The studies included in the ground school course are elementary aerodynamics, advanced airplane construction, elementary engines, and navigation and meteorology.

More than 20 students have recently been soloed at the flying school, and several of them have already received pilots' licenses from the Department of Commerce.

BRUCE PALMER has been appointed district sales manager of the Detroit office for the Thompson Aeronautical Corporation. Mr. Palmer will handle sales in that district for the Moth, Stinson and Keystone-Loening products.

FOYE SHUMAKER was recently appointed advertising manager of the Heywood Starter Corporation of Detroit, which manufactures the Heywood self starters for airplane engines. Mr. Shumaker was formerly assistant secretary of the aircraft bureau of the Detroit Board of Commerce and was active in the management of the Detroit Air shows.

SALES of the Champion Spark Plug Company for the first quarter ending March 31, 1929, showed an increase of 37 per cent over the same period for 1928, which was the previous high mark in the company's history.

The steady growth of business has made necessary several plant extensions.

MR. E. J. HERGENROETHER, until recently assistant metallurgist of the Cadillac Motor Car Company, is now associated with the development and research department of the International Nickel Company, and is located at the Detroit office.

WITH the signing of contracts for the Great Lakes Aircraft Corporation products, J. A. Connors, vice president and general manager of the United Air Transport, Inc., revealed plans for the establishment of three aircraft service stations, one at Detroit, another at St. Louis and the third at Atlanta, Georgia. Construction of the plant at the Detroit service station will start in the immediate future.

Mr. Connors also announced that seven airplane engine manufacturing companies and some twenty aircraft and accessory companies have agreed to use the facilities of the service stations for their products. The Detroit corporation will operate a transport service between Detroit and St. Louis and later on extend the service from St. Louis to Atlanta, using trimotored Fords. Wright J-6 engines will be used in the planes operating between Detroit and St. Louis, with Pratt and Whitney engines, on the transport planes between St. Louis and Atlanta.

Great Lakes Aircraft Corporation has given the Detroit concern distributorship of eastern Michigan, the north section of Ohio, and Allen County, Indiana.

MICHIGAN AIR NEWS

THOMPSON Aeronautical Corporation has been appointed distributor in Ohio and Michigan for the Moth Aircraft Company of Lowell, Mass., and the Keystone-Loening Corporation of New York City. The Thompson concern by these appointments will handle the American made form of the DeHavilland Moth, which is a two-place training and sport plane. It will handle also the craft of the Keystone-Loening firm, producers of the Loening amphibian and the Keystone Patrician.

Michigan Air Tour

TO stimulate interest in civil aeronautics, the first Michigan Air Tour will be staged by aviation interests of Pontiac, Mich., from June 10 to 14, preparatory to the dedication of the Pontiac Municipal Airport. The tour will include visits to some twenty-five Michigan municipalities and airports, covering a distance of approximately 1,200 miles. A path-finding airplane will cover the proposed route to complete local arrangements. The entries in the tour will consist of many manufacturers of airplanes who distribute in the state of Michigan.

The tour will leave Pontiac, Monday morning, June 10, and return Friday night, June 14. The following two days will be devoted to the airport dedication. Contests will consist of racing, parachute jumps, dead stick landing contests, night flying, pursuit group demonstrations, bomb dropping, balloon busting, and visits from the fliers of Selfridge Field and also from 107th Observation Squadron of the National Guard. Cash prizes of $5,000 will be awarded to the winners of the various contests.

COLONEL ARTHUR GOBEL recently inspected the new aircraft engine developed by the Continental Motors Corporation while on a tour of the Detroit plant of the firm. The motor, which was on the test stand, drew favorable comment from the flier by its advance in design.

FLO FLYING SERVICES, of Ann Arbor and Detroit, Mich., have ordered 18 Arrow Sports for the State of Ohio and 25 for the State of Michigan.

THE all-metal dirigible designed by Ralph H. Upson for the Navy is nearing completion in the hangar of the Aircraft Development Corporation at Grosse Isle, near Detroit. The metal-clad ship which incorporates revolutionary changes in dirigible construction, will be tested early in the summer. Termed by aeronautical engineers as a daring feat in engineering, this new dirigible will be fire-proof, weather-proof, durable, and permanent in structure, and navigable in all kinds of weather. The thin metal covering of the ship is aluminum alloy, with duralumin as its base. The strips of thin metal are held together by tiny rivets, measuring a few thousandths of an inch in diameter. This ship will be only three times as long as its maximum diameter. It will be powered by two engines, each of 200 horsepower, which will be hung on frames extending from the control car.

After all it takes a flight to convince you

IN previous advertisements we've been telling you a lot about the mechanical features of the COMMAND-AIRE plane.

But now we want you to try one—either as pilot or passenger—and are going to make it easy and convenient for you to do so. For after all, it takes a flight to convince anyone as to the performance—including stability—of a plane.

Thus we give you below the names of COMMAND-AIRE distributors in various sections of the country. We know that any one of them will be glad to demonstrate the COMMAND-AIRE performance to you.

Whether you are interested in handling COMMAND-AIRE planes, or merely interested in flying one, we are happy to make it easier for you to test the positive stability of the COMMAND-AIRE where it should be tested—in the air.

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Miller Aircraft & Motors, Inc.
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SYRACUSE, NEW YORK
General Aviation Company, Inc.
208 South Geddes Street

DETROIT, MICHIGAN
A. R. Taylor
214 Junction Avenue

ST. LOUIS, MISSOURI
Radio Aircraft Corporation
Melbourne Hotel
Care of Radio Station WIL

FORT WORTH, TEXAS
Texas Flying Service

TULSA, OKLAHOMA
Command-Aire Sales Corp.

OHIO AIR NEWS

By T. E. Lunsford

THE Macomber Steel Co., of Canton, will erect an addition to its airplane manufacturing division which will greatly increase the working force there. The building will be 76 by 188 feet.

THE Air Reduction Co., of New York, will erect two plants in Toledo at a cost of $250,000. One is to be an acetylene gas plant, which will have 41,200 square feet of floor space and will be of brick and steel. The other will be an oxygen plant, in which a variety of products, including helium gas, will be manufactured.

THE George Whysall Associates, Inc., of Marion, has been organized to produce a new cabin monoplane, the first model of which is being designed and built in a Marion factory. Mr. Whysall is general manager of the Marion Water Co. and C. M. & B. Electric Railway Co. Other incorporators are C. A. Owens, Frank Glosser, H. J. Barnhart and M. C. McNeil, all Marion industrial men.

NEGOTIATIONS opened three months ago by officials of Air Services, Inc., Akron, with the Curtiss Flying Service and the Fairchild Airplane Manufacturing Corp., have been completed and it is announced that the Akron concern, which will operate a flying school and allied activities at Akron Municipal Airport, has signed sales franchises with both manufacturers.

THE Alliance Aircraft Corp. has appointed two distributors to handle its planes and has received initial orders from these distributors for 75 planes. Edgar J. Leefy, of Youngstown, who has been test pilot for the organization, has resigned his position to become distributor for the Ohio district. He will be succeeded as a test pilot by W. J. Leonard, Providence, R. I. The Oburg-Prentice company, Pittsburgh, has been named distributor for the Pennsylvania-West Virginia district.

THE recently organized Dayton Air Institute, Inc., has begun activities. The institute has acquired 184 acres of land bordering the Springboro pike south of the old Moraine flying field and extending to Kettering Blvd. The course worked out by the institute provides for five weeks of prescribed ground study, with actual flying to be taken up at the completion of this work.

Officers of the concern are Howard Rhinehart, president; Howard P. Williamson, vice-president, and J. W. Kuntz, secretary and general manager.

THE Superior Electric Engineering Co. has been awarded the contract for lighting engineering at the Columbus Municipal Airport. The company's bid includes installation of 52 boundary lights, one rotating beacon, one ceiling light, 18 obstruction lights, four wind indicator lights and one 2,000,000 candlepower floodlight.

C. O. MINIGER, president of the Electric Auto-Lite Co., Toledo, has confirmed the report that the company is interested in the formation of a new $140,000,000 corporation for the manufacture of airplane accessories. The Eclipse Machine Co., Elmira, N. Y., the controlling interest in which is held by the Auto-Lite Co., will become a part of the new corporation, Miniger said. Other companies in the merger are the Scintilla Magneto Co., which has a large portion of the magneto business, and the Stromberg Carburetor Co., which has been a leader in the developments of carburetion for airplane motors.

Flamingo Six-Year Guarantee

DIRECTORS of the Metal Aircraft Corporation of Cincinnati recently authorized the extension of the guarantee and warranty on the all-metal Flamingo produced by that company from the usual ninety days to six years. This step has been pronounced by aviation authorities to be an outstanding advance by airplane manufacturers, visualizing, as it does, ten years of useful service for the individual operator or owner.

AVIATION COLLEGE, INC., affiliated with Robbins Flying Service of Akron, has installed a complete aircraft welding class in its list of courses of aeronautical instruction. The course is designed to prepare the pupils for participation in the manufacture of airplanes.

The directors of the school are Hugh C. Robbins, president; Allen T. Simmons, vice president; and Lt. R. W. Barnes secretary-treasurer.

LATE in 1927, in anticipation of the greatly increased volume of sales, plans and specifications were drawn up by the Advance Aircraft Company, Troy, Ohio, for the construction of the new plant and airport. Early this spring, the last unit of the old locations was moved into the new plant, bringing all processes under one roof and control. The airport improvements which have kept pace with the plant construction, were completed at the same time. At the present time eight buildings comprise the group, totaling approximately 100,000 square feet of floor space. There is a main factory building, administration building, heat and power building, acetylene generator building, paint and oil storage building, delivery hangar, service and repair shop, and a restaurant for employees.

The servicing problems of Waco airplanes are handled through the activities of approximately forty distributors in the United Stats. These distributor activities are augmented by nearly 200 Waco dealers in more restricted areas.

THE Advance Aircraft Company, Troy, Ohio, has appointed H. T. Ailor, as special representative in connection with sales promotion and dealer contact work in the field. Mr. Ailor was formerly sales manager for the American Aircraft Company of Los Angeles, California, distributors for Waco airplanes in the State of California.

CLEVELAND AIR NEWS

By M. Mirvis

PLANS are rapidly taking shape for the National Air Races, according to Floyd J. Logan, president of the Cleveland chapter of the National Aeronautic Association. Races will begin on August 25, and the exposition will open the preceding day at Public Hall. Fireworks demonstrations at night, illuminated maneuvers on the last three nights of the show, and other features are included in the tentative program. Prize money amounting to $100,000 will be awarded, according to Mr. Logan.

ATTORNEY EDWARD J. DEMSON is teaching aviation law at Cleveland Institute of Aviation in the institute's headquarters at the Society of Savings Building. Demson is a graduate of Ohio State University and served in the Army Air Service during the World War.

SKYWAYS, INC., of Ohio, has broken ground for its $45,000 hangar at Cleveland Airport. W. A. Warrick, Jr., is president of the company. Skyways, Inc., is distributor in this locality for Stearman, Challenger, and Flamingo planes. The new hangar will be 70 by 100 feet. W. F. Spieth is vice-president; David P. Pringle, secretary and treasurer, and G. E. Stoll, chief pilot.

CURTISS FLYING SERVICE, INC., has bought a 140-acre plot at Wilson Mills and Lander roads, Mayfield Village, an outlying suburb. A $500,000 airport will be built there, and upon completion of clearing the tract, a hangar will be built. A building to house the activities of the flying school will also follow.

AIR passenger service between the business centers of Cleveland and Detroit will soon be inaugurated by the Thompson Aeronautical Corporation, giving a fifty-five-minute service between these cities, the officers of the company recently announced. The route over Lake Erie will be flown by Keystone-Loening amphibians.

Construction on air terminals for the service will begin immediately. The Cleveland station will be located at the foot of Ninth Street, and the Detroit terminal will be adjacent to the U. S. Naval Reserve. The time schedule for the run is arranged to meet the needs for business communication between the two cities, two planes taking off simultaneously from each point at 8 a. m., with intermediate departures throughout the day, the final departure being at 6 p. m. The amphibians will carry six passengers and 500 pounds of baggage.

THE Great Lakes Aircraft Corporation is to build a new sport pursuit plane capable of a top speed of around 140 miles an hour. This machine will be on the same principle as the 2T-1 but with a number of refinements, including tapered wings, especially tuned motor and steel propeller. As with the 2T-1, the sport pursuit machine will be powered with a Cirrus four-in-line, air-cooled motor, developing 95 horsepower.

(*Continued on next page*)

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MOHAWK AIRCRAFT CORPORATION
2641 DELAWARE STREET S. E., MINNEAPOLIS, MINN., U. S. A.

(Cleveland Air News continued)

THE Great Lakes ship at the All-American Aircraft Show was exhibited in a unique fashion. It rested on a turntable, the table and floor space being covered with crimson velvet.

Two Trainers were flown over from the home plant in Cleveland to the Ford Airport. One machine was piloted by Charles W. Meyers, chief test pilot of the corporation, who helped design the machine. Cy Caldwell, another noted flyer and contributing editor of AERO DIGEST, flew the other machine to Detroit.

Lady Mary Heath used one of the Trainers in a speed performance over a triangular course of 50 kilometers. Ray Cooper, manager of the All-American Aircraft Show, appointed officials to clock the flight. She was clocked at a little better than 115 miles an hour.

AIRPLANE engine valves to equip all Wright engines produced during the remainder of 1929 were ordered recently by the Wright Aeronautical Corporation of Paterson, N. J., from the Thompson Products, Inc. The order totaled over $500,000.

The valves are for five current Wright engine models, using from five to nine cylinders and ranging in horsepower from 150 to 525. It is estimated by Thompson officials that 30 per cent of the total volume of the company's Cleveland plant this year will come from airplane manufacturers, with a probable increase to 40 per cent in 1930.

COLUMBUS AIR NEWS

By W. DONALD WALTER

THE Ohio General Assembly in joint session on April 3rd presented Mr. Orville Wright with an embossed copy of a resolution introduced by Senator Kuhns. It commemorates the twenty-fifth anniversary of the first flight. Presentation was made by Governor Cooper.

PREPARATIONS are well under way for the Air Corps maneuvers in May. Major John Reynolds of Mitchel Field is on temporary duty at Fort Hayes in connection with the maneuvers. There will be a concentration of about ninety-five ships at Norton Field and about one hundred at Wright Field. Most of the pursuit planes stationed at Norton Field will be Curtiss P1s and P1Bs. The observation outfits will be equipped with Douglas 02s and possibly some Curtiss 01 Falcons. The attack group will use Curtiss A3s, and the bombardment group will probably use Keystone LB5s. Transport service will be taken care of by Douglas, Fokker and Ford transports. This will be the largest concentration of aircraft ever assembled at Norton Field, and the commanding officer, Lieutenant A. R. McConnell, who is to act as supply officer, has a big job ahead.

LIEUTENANT RALPH B. SCOTT, Air Corps Reserve, has joined the staff of Linden Airways, Inc., as chief pilot and instructor. The company, which has only recently been organized, is operating from a field located on the northern outskirts of the city. Lieutenant Scott is well known to reserve officers in this area. Sam has been flying regularly at Norton Field since 1923, and probably has as much flying time to his credit as any of our local reserve pilots.

THE aviation progress dinner under the auspices of the Columbus Real Estate Board at the Deshler-Wallick Hotel on March 22nd proved most interesting. The dinner was good, the speakers were better, and the three hundred air-minded guests enjoyed the evening thoroughly.

The speakers included Marshall C. Hoppin of the Department of Commerce, Major C. E. McCullough, of the Pennsylvania Railroad, Hugh Allen and W. C. Young of Goodyear, Major Thomas Lanphier, and Kline L. Roberts, secretary of the Columbus Airport Commission. At the speakers' table we also noted Major John Reynolds of Mitchel Field, Major H. C. K. Muehlenberg, Lieut. Ennis C. Whitehead, Lieut. A. R. McConnell, Service Director Duffy, and C. L. Morris, president of the Aero Club of Columbus. H. L. Samuels presided at the banquet, and John M. Vorys acted as toastmaster. Several beautifully-performing models were flown in the hall by members of the Junior Aero Club.

LIEUT. ALBERT E. HARTER, Air Corps Reserve, and John M. Vorys, former Navy pilot, are being considered for the newly-created position of Director of Aeronautics for the state.

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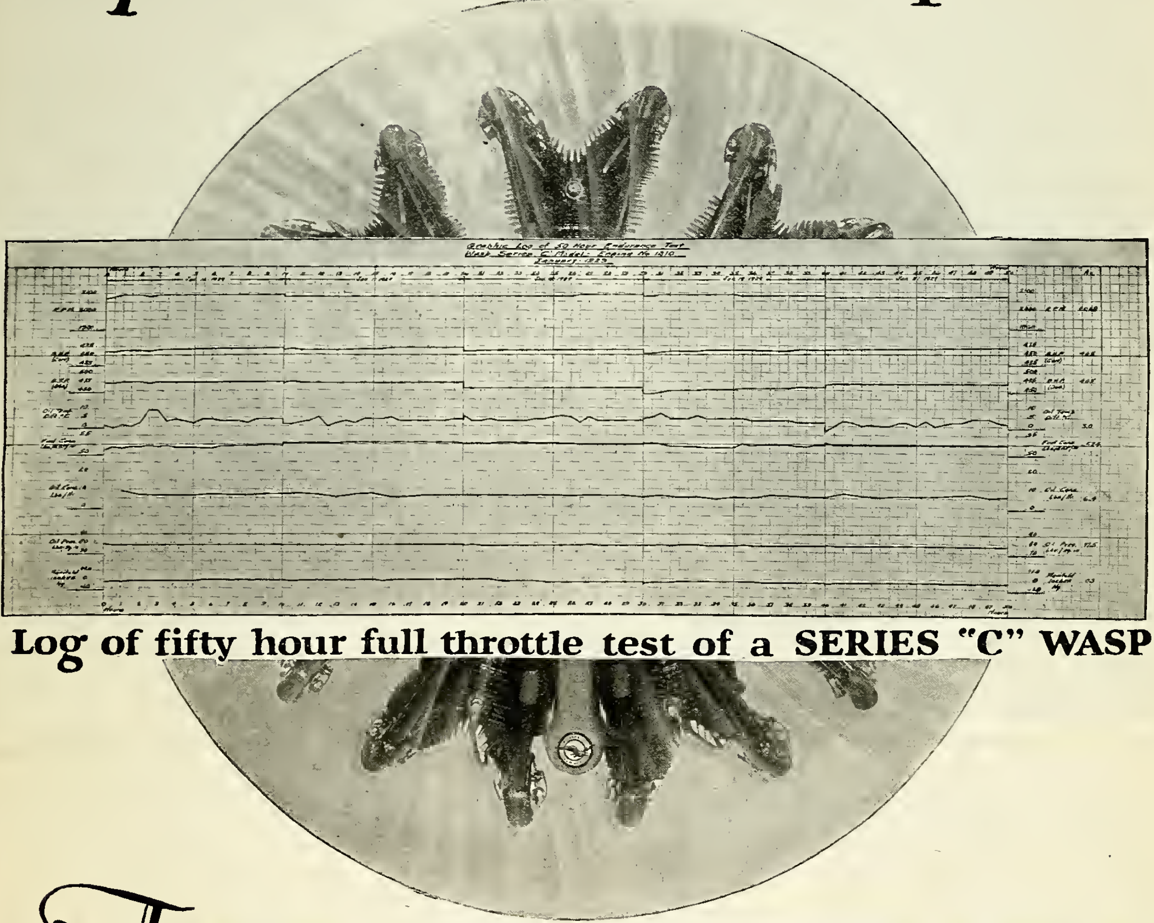
Graphic Log of 50 Hour Endurance Test
Wasp Series "C" Model – Engine No 1310
January 1929

Log of fifty hour full throttle test of a SERIES "C" WASP

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To insure the maintenance of these quality standards, every sixty days a "Wasp" or "Hornet" is selected at random from the production line and subjected to a fifty-hour full throttle endurance test. Thus the extreme care used in the construction of the "Wasp" and "Hornet" is further checked for the protection of the flying public.

Operators — please note. Engines which have been subjected to the above test will be sold with the factory guarantee at a price which will take into consideration the hours of operation.

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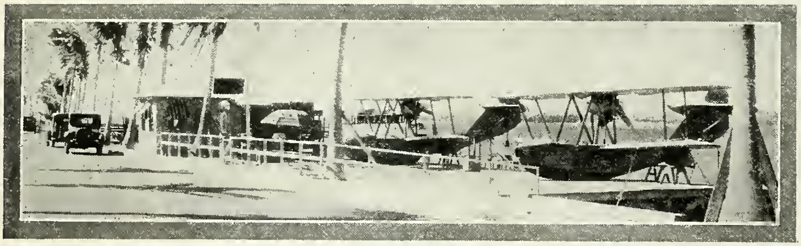
Wasp & Hornet
Engines

FLORIDA AIR NEWS

By Johnson Wright

THE Krueger Air Lines, Inc., was recently organized to operate airports, flying schools, a general taxi service, and airlines. The officers are A. P. Krueger, president and treasurer; Hugh L. Willoughby, Jr., vice president; and Carroll Dunscombe, secretary. In addition to the officers, the directorate is composed of James H. Reardon, Jr., Ernest L. Ricou, W. S. Rufly, Edward Trainer, Howard Richards, and Otis Ashley. The company is dealer for the Curtiss-Robin and other Curtiss products in the central section of Florida. Operations are at this time confined to the cities of Stuart and Fort Pierce, but the service will be expanded to other cities as rapidly as the organization permits.

THE St. Petersburg Aero Club has been reorganized and Robert C. Smalley is the new president. Other officers of the club are Herman M. Craig, secretary-treasurer; L. M. Cooper, field manager; and O. P. Graff, assistant field manager.



Operations base of the Curtiss Flying Service at Palm Beach.

THE city of Vero Beach has secured a 120-acre tract of land for an airport. The location is just north of the city and within the city limits. $2,500 will be spent immediately in preparing the runways.

THE Royal Palm Airways, Inc., has purchased five acres of land adjoining the Orlando municipal airport, on which will be built a hangar, dormitory, and other facilities, sufficient to provide accommodation for 150 students.

THE Airways Transport, Inc., Florida distributor for the products of the Mono-Aircraft Company, has started its pilots' training school at the municipal airport in Fort Myers. Construction was recently completed on the company's new hangar, which is one of the most complete and modern in the South, being equipped with radio, telephone, rest rooms, offices, and a complete workshop for the repair and maintenance of planes and motors. The officers are C. Franklin Wheeler, president; Donald Bellows, treasurer; and Phillip R. Roll, secretary and general manager.

THE Aero Export Company has selected Tampa as its southeastern distribution headquarters. This company is a subsidiary of the Travel Air Mfg. Company and has charge of all sales in Central and South America, Australia, and the Orient. Planes for Central and South America will be shipped by rail to Tampa.

THE airport that the City of Fort Lauderdale has been building for several months will on May 1st be dedicated as the Merle L. Fogg Airport, in memory of Merle Fogg, pioneer pilot, who was killed in May, 1928.

THE Miami Municipal Airport has been increased 50 per cent in area. The city commission on April 8th approved the purchase of 80 acres of adjoining property to increase the area of the airport to 240 acres. Many additional facilities including new hangars are expected to be added within the next few months to provide for the large volume of business.

A DAILY air passenger and express service between Washington, D. C., and Miami will start December 1st, according to an announcement by A. A. Schantz, president of the Detroit and Cleveland Navigation Company, which will operate the service.

Orders have been placed for four Dornier Super-Wals, powered with four Pratt and Whitney Hornet engines, to be used in this service. According to present plans, nonstop flights will be made between the cities. Arrangements are now being made in Miami for terminal facilities on Biscayne Bay.

THE new amphibian produced by the Miami Aircraft Corporation was successfully tested on March 26th by Eddie Niramier. After additional tests have been made and an approved type certificate received, the ship will be put into production. The new amphibian has accommodations for pilot and four passengers in an enclosed cabin. It is a monoplane equipped with a Minasco Salmson engine. Tests made already indicate that the top speed is around 120 miles per hour. The designing engineer is L. C. McCarty. J. M. Smoot is president of the corporation.

STEEL structural work on the new hangar at the Tampa municipal airport was completed recently, and the remaining construction is progressing rapidly. When finished this $20,000 hangar will have 15,000 square feet of concrete floor space.

SIX days 7½ hours were required for the first flight from Miami to Mollendo, Peru, completed April 15 by planes of Pan American and Pan American-Grace Airways, in the inauguration of the new South American service. The new route is 4,484 miles long, extending from Miami to Belize, Cristobal, Guayaquil, to Mollendo. This route puts into operation a large part of the Cristobal-Santiago air mail contract awarded to the Pan American-Grace Airways.

SEVERAL Travel Airplanes received recently by the McMullen Aircraft Company of Tampa are being flown for demonstration purposes in Havana, Cuba.

MIAMI-PANAMA AIR MAIL SCHEDULES

THREE-DAY mail service between the United States and Panama Canal Zone has been established by Pan American Airways with a new schedule recently inaugurated. The new schedule provides complete service in both directions three times each week, with planes leaving simultaneously from both ends of the route, meeting halfway at Tela, exchanging cargoes, and returning to their home terminals. Plans are progressing rapidly for the early addition of passenger service to the mail cargo now carried.

According to the new arrangement, the mail leaves Miami at 7:00 a.m., Havana, 10:30, La Fe, Cuba, 12:30 p.m.; and arrives in Belize, British Honduras, at 4:30 for overnight: leaves Belize at 9:00 a.m.; Tela, Honduras, 11:00; the plane arrives at Managua, Nicaragua, at 2:30 p.m. for overnight, and leaves at 7:00 a.m., reaches David, Panama, at 12:30, and arrives at Christobal, Canal Zone, at 3:00 p.m. of the third day.

On the trip northward the stops overnight are made at the same towns; and the schedule is as follows: Leave Christobal 7:00, David 10:30; arrive Managua 3:00; leave Managua 9:00 a.m.; Tela, 11:00; arrive Belize 2:30, leave Belize 7:00 a.m.; Cazumel, 10:00; Havana, 2:30; and arrive at Miami at 5:00 p.m.

VIRGINIA AIR NEWS

By C. N. Snead

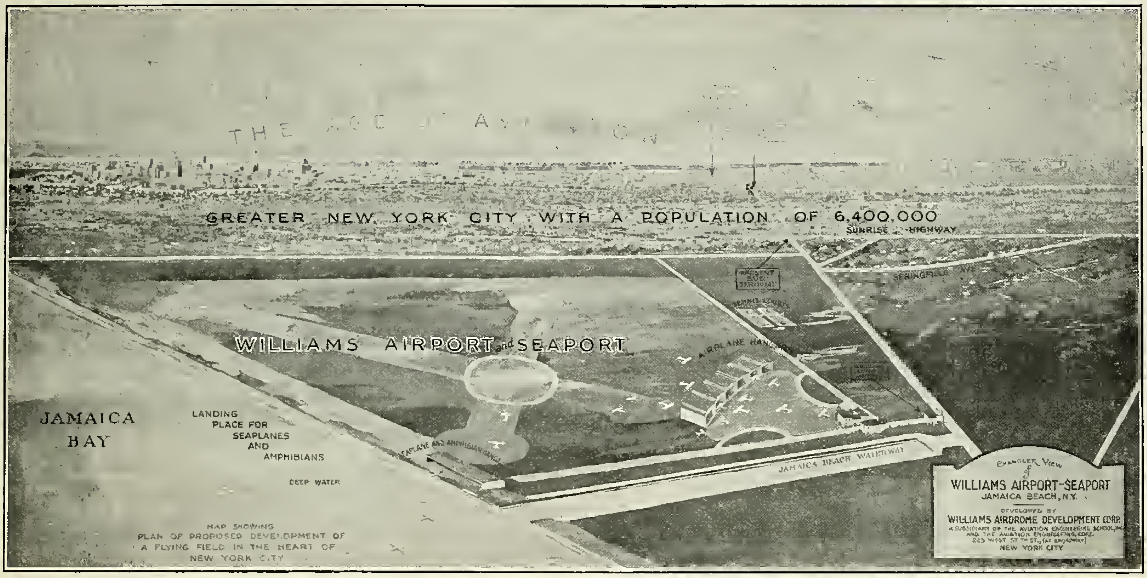
THE Roanoke Airways, Inc., has been organized at Roanoke to operate a flying school, to promote commercial transportation and to sell airplanes. Officers of the group are J. Shirley Riley, president; J. H. Bawden, vice-president; Henry M. Glasgow, secretary-treasurer; and D. K. Steele, chief pilot and field manager.

A school is to be conducted for student instruction in all branches of aeronautics and mechanics. So far as it is known this concern is the first to be incorporated to sell airplanes in this vicinity. The firm has obtained the agency for Aeromarine-Klemm planes.

ON May 1, the anniversary of the first air mail between Richmond, New York and Atlanta, a seven-day-a-week air mail service will be inaugurated by the Pitcairn Aviation Corporation.

FLIGHT practice between ship and shore has been under way aboard the aircraft carrier *Langley* at Hampton Roads, and the naval air station at Norfolk. The *Langley*, Captain A. B. Cook commanding, arrived in the Roads April 7 after having been away since early in January.

FIRST $2,000,000 WILLIAMS AIRDROME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DEEP WATER
MAP SHOWING PLAN OF PROPOSED DEVELOPMENT OF A FLYING FIELD IN THE HEART OF NEW YORK CITY
Chandler View of
WILLIAMS AIRPORT-SEAPORT
JAMAICA BEACH, N.Y.
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IN keeping with the phenomenal development of aviation and the increasing application of aeronautics to commercial service and recreational pursuits, Miss Olive Branch Williams, president of Aviation Engineering Corporation, has begun work on a string of proposed airports along the Atlantic coast.

The first of these, a combination land and seaplane port, has been opened at Jamaica Beach, on April 20th—only thirty minutes from the business center of New York City. Miss Williams is planning to open the second airdrome of her chain in the White Mountains of New Hampshire and the third at Miami, Florida. It is her intention to continue this chain, after successful operations have been established on these first three, all along the East coast.

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We want followers, boosters . . . . . not just anyone, but the boys who are interested in seeing aviation "go over with a bang." We want a thousand such members by mid-summer. By sending $5 to Miss Williams, president, you will receive a recognized Membership Card and Pin. When you show this Pin and Card to any Williams' pilot on any of the Williams Airdromes, you will enjoy, without charge, a generous sightseeing hop; or one flying lesson under the guidance of an experienced instructor. If you prefer, this payment will be credited on any of the courses in our school.

The ideal flying time is NOW. Join up without delay, trouble or red tape. Be one of the first thousand members.

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I want to take advantage of your offer. Enclosed you will find my five dollars in payment for Membership Card and Pin which entitle me to the privileges stated herein, at your Airdromes.

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Address ....City and State.............

DALLAS AIR NEWS

By Capt. W. H. Scott

IMMEDIATE construction of a 36-room hotel at Love Field at a cost of $75,000, for the convenience of student fliers and visitors was announced by C. E. Harmon, vice-president of the Dallas Aviation Industries. Contracts for the building have been let. The new structure will be so erected as to provide additional stories when needed. The famous old Airway Cafe is to be moved back and the new building will be erected on the site. The old cafe will remain in operation, however, until the new building has been completed. What will become of it after this? Many old airmen propose that the place should be used as a club, since thousands of airmen from all over the world have stopped there for a meal or rest.

CITY street Commissioner Arthur J. Reinhart announced that the new field at Grand Prairie cannot be turned over to the Government until various law suits contesting the action of the city have been settled. The city had agreed to lease the field to the Government for one dollar per year. This lease is for Government training purposes only, and it was pointed out that the city would still be able to use the field for air mail and commercial flying. On this matter a difference of opinion exists.

ERECTION of a big hangar 100 by 200 feet for the Dallas Aviation Industries has been announced by Bill Long, president of the firm. The new hangar will be built on the space occupied by hangar II that recently burned down.

PLANS to open a new airport at Corsicana have been completed, and the port will open as this issue goes to press. The city government has leased the field, and H. J. Nichols, local aviator, will have charge of activities at the field. One hangar has been built.

THE advice of William Centner, of the Department of Commerce, to the city of Denison to lay out a first class field that will meet Government specifications will be acted upon, according to word from Mayor W. S. Hibbard. Hangars will be built and a gasoline station erected immediately.

FORT WORTH AIR NEWS

By Capt. W. H. Scott

HANGAR space at the municipal airport must be doubled during this year and increased five times during the next ten years, Bill Fuller, airport manager, has informed the city council. He also recommended that the field be drained and tiled and that the new addition be graded.

Hangar space is now provided for forty planes of average size, but during the past three months, this space has been taxed to its uttermost. Construction of three hangars yearly, each 320 by 80 feet, was urged by Fuller. When the whole program is complete, space will have been provided for about 700 planes.

Plans for an administration building call for a three-story structure, 100 feet long. This would house offices of operating companies, manager's office, mail room, Department of Commerce, radio room, light control room, waiting room for passengers, express and ticket offices, etc. Other improvements demanded call for a loading shed for passengers and freight, concrete apron before the hangars, a six-foot wire fence around the field, car garage and a playground for children.

PLANS for a series of small flying schools that will take in small towns in Texas have been completed by Seth Barwise, president of the Texas Flying Service. Agencies for Command-Aire planes will also be established at the various points. Henry Woods is chief pilot of the concern.

A BIG convoy of Fort Worth planes took part in the opening of the Mineral Wells airport. A. P. Barrett, president of the Southern Air Transport, was the guest of honor and made the keynote talk.

Eight runways are provided on the new field. There is a large hangar, service station, and a rest room at the field. Amos Arnold is airport manager, and LeRoy Severance has opened a school and taxi agency.

T. T. PENDLETON, local oil operator and leader in aviation affairs in Fort Worth, will head the Texhoma Aeronautical Service, Inc., a new concern that will sell Stinson planes in Texas and Oaklahoma.

TWO new passenger lines have been added by the Southern Air Transport during the past month—from Fort Worth-Dallas to San Antonio and Fort Worth-Dallas to El Paso.

ALABAMA AIR NEWS

By Robert H. Brown

WITH the discontinuance of passenger service on the New Orleans-Birmingham-Atlanta mail line, there are rumors that Southern Air Transport, which recently was organized to take over the Gulf Airlines and the Texas Air Transport, will start a passenger line from Atlanta to Dallas. The route will probably be by way of Birmingham and Shreveport, La.

AN airport is being planned at Evergreen, Ala., by the Lions Club there. C. N. Stallworth and L. D. King, Jr. have been appointed members of a committee to investigate the possibilities of a field being provided.

THE American Legion of Enterprise, Ala., is waging a campaign for an airport in that town. The measure was introduced by Post Commander P. H. Stokes.

WORK will start on the first units of the Army air tactical school to be erected at Montgomery in the near future. Other units will follow as soon as the first are completed.

THE city commission of Birmingham has promised that within the next thirty days it will announce definitely whether or not the city will build a new municipal airport. The city has been working on a new municipal airport for two years, but thus far more dreaming than work has been done. In the meantime all of the aviation business is going somewhere else besides Roberts Field, which is too small and rough for ships of any size.

CONTRACTS have been let for a hangar with adjoining buildings for a work shop, waiting room, offices and school quarters at the new 600-acre airport at Montgomery. The contract was let to Hodgson and Jones, Montgomery contractors.

MESSER FIELD, operated by the Southern Aircraft Corporation at Birmingham, has been enlarged.

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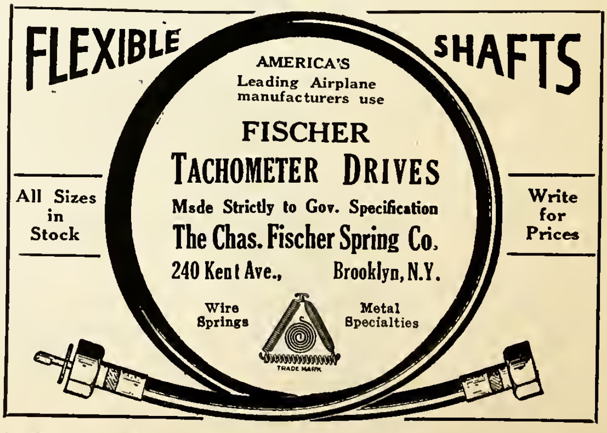
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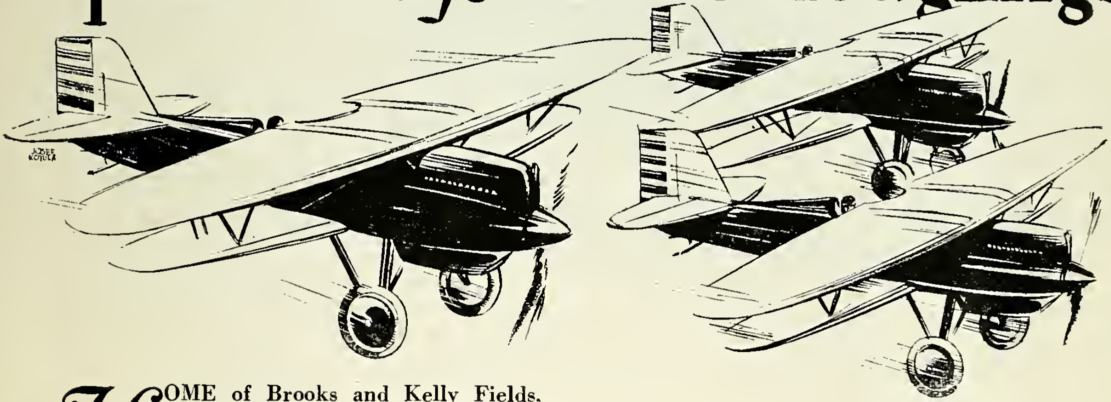

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TENNESSEE AIR NEWS

Nashville Notes

By Virginia Matthews

PLANS for a complete aeronautical school in Nashville, in addition to taxi and charter trip service, are now under way through the efforts of Capt. R. H. Polk and Lieut. Art Smith. The school is to open with three planes, and others will be added as the need grows. Capt. Polk and Lieut. Smith are also completing plans for the organization of the military aviation school at Castle Heights Military Academy at Lebanon, Tenn. Capt. Polk is president and Lieut. Smith is vice president and manager of the Castle Heights Academy.

PURCHASE of a new airport containing approximately 200 acres was announced recently by Col. W. G. Schauffler, Jr., general manager of the Interstate Airlines, Inc., operators of the airline from Chicago to Atlanta by way of Nashville.

Col. Schauffler announced that the United Aviation Corporation of Chicago, holding company of the Interstate company, had exercised its option and entered into a sales agreement for the purchase of the airport located between Nashville and Murfreesboro. Prior to this time, the company was using McConnell field, Nashville's municipal airport. The company plans an expenditure of approximately $125,000.

The field will be known as Tennessee's Sky Harbor. Public storage facilities, an aviation institute and sightseeing, cross-country and taxi service will be provided at the field. In addition, airplane and accessory sales will be handled under agency contracts with leading manufacturers.

The location of the field with respect to national air transport lines is such that it should quickly become of service to all middle Tennessee. At present, McConnell Field will be used until night flying service is inaugurated.

DESIGNED to promote commercial aviation, a bill providing for emergency landing fields in Tennessee was introduced to the general assembly April 1st. The proposed measure provides for an appropriation of $10,000 for the acquisition of emergency landing fields between Memphis and Knoxville by way of Nashville and Chattanooga. The bill further provides that such fields are to be established at distances not more than 20 miles apart with the installation of beacon lights for night flying.

Arthur Menken, who plans a foreign tour.

NEW JERSEY AIR NEWS

CHARLES FROESCH has been appointed sales engineer of the Fokker Aircraft Corporation of America. according to a recent announcement of Anthony H. G. Fokker.

In his new duties as sales engineer, Mr. Froesch will establish contacts between the sales, engineering and production departments, and he will also organize and direct the service department and establish contacts with Fokker operators.

A NEW flexible lacquer and a surfacing material, TiTen, has been announced by Titanine, Inc., Union, N. J. The new surfacing material contains no nitro-cellulose, gums, or plasticizers, and is practically non-inflammable.

Titanine. Inc., has recently registered for operation in the State of Illinois and the State of Kansas, and has arranged for distribution of its products from warehouse stores under the care of resident salesmen in Wichita and Chicago. A new lacquer [illegible] has been added to the Union, N. J., plant.

THE Pioneer Flying School, Inc., of Arcola, N. J., was purchased recently by Ivan R. Gates, president of the Gates Flying Service, Inc. Charles F. West, general manager of the Pioneer concern, will act as service manager of the Gates firm.

HAROLD W. LAY was appointed general sales manager of the Murphy Varnish Company of Newark at a recent meeting of the board of directors of the concern. Mr. Lay was formerly vice president of the Canadian branch of the firm.

FLYING a New Standard airplane specially equipped, Arthur von Breisen Menken will start a year's flying tour of Europe, northern Africa and Asia next fall. The regular New Standard plane is being equipped with complete instrument equipment, special fuel tanks, water vaporizer and compartments for clothing, food, and guns, at the Paterson, N. J., factory of the New Standard Aircraft Corporation.

Mr. Menken plans to hop off from England and fly over Europe to North Africa. After an exploration of Morocco, Algeria and Egypt, he will travel up the Nile and then fly over Mesapotamia, Persia and India to the Far East. From Japan, Mr. Menken will return by boat to San Francisco and fly across the country to New York.

PENNSYLVANIA NEWS

PITTSBURGH AVIATION INDUSTRIES CORPORATION will build a training airport on a 610-acre tract in Penn township, 45 minutes from the center of Pittsburgh, according to a recent announcement of George R. Hann, president of the Pittsburgh Aviation Industries Corporation. The completed training center will cost more than half a million.

B. B. T. Representatives

IN order to establish closer contact with the individual airports throughout the country and to give prompt service at all times, the B.B.T. Corporation of America has for some time been developing an organization of district representatives to look after the distribution and servicing of B.B.T. airports lighting equipment.

Each of these representatives is either a [illegible]ed aviation lighting specialist, or has trained one particular man in its organization with such training. They are located in the following cities: New York City;

(Continued on next page)

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FIRST, look at the engineering staff:

As Chief Engineer, Frank S. Hubbard (*Mass. Inst. Tech.*) brings a wealth of experience, coming directly from the responsibility of executive head of the Technical Department of Curtiss.

And standing beside him as Chief of Research is William H. Miller (*Univ. Missouri and M.I.T.*) an outstanding aerodynamic expert, designer of the wind tunnels at Massachusetts Institute, lately in charge of Research Laboratory at Curtiss.

DESIGN AND CONSTRUCTION

William Wait, Jr. is best known as the design engineer on the most successful Curtiss models, including the Schneider Cup and Pulitzer Trophy racers. Then he went to Chance-Vought and now is Berliner-Joyce Chief of Design.

Earl P. Osborn (*Rensselaer Polytechnic*) is in charge of Structures. He was in charge of the propeller department at Curtiss, later made head of Curtiss Structural section.

As factory superintendent, Thos E. Pell (*Lehigh Univ.*) brings a wealth of experience, from the same responsibility with the Naval Aircraft Factory at Philadelphia.

BACK OF IT—

Henry Berliner (*Mass. Inst. Tech.*) was the designer and builder of the Berliner helicopter and monoplane, and president of the absorbed Berliner Aircraft Company. He becomes *Vice-President* of Berliner-Joyce in charge of Production.

Temple N. Joyce (*Balto. Poly. and Lehigh Univ.*) is internationally known as test pilot for the Army during the war, testing practically every type of plane constructed by the Allied and Central Powers. Later Washington representative of the Curtiss Company, and then sales manager for Chance-Vought. He is *Vice-President* in charge of Sales.

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(Pennsylvania News continued)

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NEW ENGLAND NEWS

By George W. Hamblin

PERHAPS the biggest news of the month is the appointment of Capt. Albert L. Edson as airport director at Boston.

The appointment by Mayor Nichols was received with acclaim by the gang, for Capt. Edson knows flying if anyone does, and he possesses the ability to manage things with a fair dealing toward everybody.

BIG business has finally come into the flying game in this neck of the woods. First it was the Moth plant at Lowell, a large interest in which has since been bought by Richard F. Hoyt, of the Hayden Stone Company of Boston. Then Curtiss Flying Service bought out Boston Airport Corp., New England Aircraft, etc., putting most of the old timers in good jobs and giving them a full meal three times a day, a thing most of them thought was impossible. Then Skyways, Inc., with a new outlook on things for the year, signing up as agents Bellanca and Moth, to round out their line. Then Fred Ames, Boston's original flying sportsman, formed the East Coast Aircraft Sales Corporation. Frank Le Man is his sales manager.

By the way, we received a fine bawling out from Frank for the story we wrote about him in Aero Digest a couple of months ago. We stated that he had left the Curtiss Flying Service's employ, but failed to state that he had gone with Fred Ames as sales manager. We hereby rectify our mistake, and humbly apologize.

Fred Ames announces that he has signed up Travel Air for the New England states, and continues by stating that his company will also represent the Keystone-Loening company. He will also be the repair representative for Wright Aeronautical Corporation.

Ames has his plans for his hangar all drawn up.

Boston Airport Developments

THE loan order for $250,000 for the further development of the Boston Airport, which Mayor Nichols submitted to the city council recently, was passed on April 15, and work under this appropriation will start immediately. Half of the sum will be used for the construction of an administration and control building with restaurant, waiting room, ticket offices, and other general facilities for the public, as well as pilots' rooms and quarters for the various city, state and Federal officials stationed at the airport. The other half will be used for lights and for the immediate expansion of the landing area. A further loan order is planned as soon as this has been expended.

MODERN AVIATION ENGINES

By Major Victor W. Pagé

MODERN AVIATION ENGINES, by Major Victor W. Pagé, is a treatise in two volumes on power plants used in the aviation industry, covering construction, operation, repair and use. It is intended principally for reference and text use.

These volumes describe the various leading American, English, French, German and Italian aeronautical engines. The text considers principles of operation, elementary thermo-dynamics, design and construction of all engine parts and their relation in the assembly. It tells why certain constructions are favored, and shows by diagrams, charts and lettered photographs, why airplane engines work as they do, and how they are installed, serviced, repaired and operated. It outlines materials of construction, considers special alloys for various uses, and gives working drawings showing all parts in proper proportion of the leading engine designs. It has chapters on the design features of both water and air-cooled engines. All accessory systems, such as lubrication, carburetion, cooling and ignition are described at length. Chapters are given on the leading commercial engines such as the Wright Whirlwind and Cyclone; Pratt and Whitney Wasp and Hornet, Anzani, Cirrus Mark II and III; Caminez, Packard, and Curtiss air and water-cooled types.

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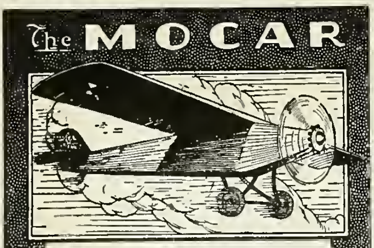

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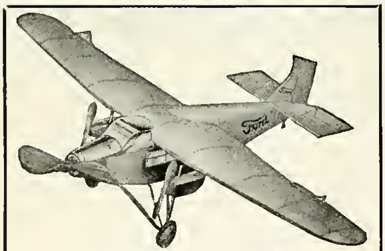

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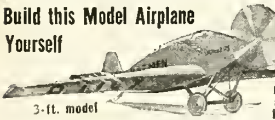

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RHODE ISLAND NEWS

By Thomas F. Bresnahan

THE Bee Line Aircraft Corporation of Pawtucket has begun the manufacture of helicopter type of plane. This corporation has been in existance about two years but had not been active until recently. The machine on which the firm is working will embody several improvements over that built two years ago, and though the company is guarding its secret, it is understood that the officials of the company are extremely optimistic.

Secretary J. H. Lynch in an interview declared that the plane will be assembled at the North Attleboro Trades School and that the parts will be made by the American Coin Lock Company, in Pawtucket. Tests of the ship will be made here before sending it to New York.

THE Curtiss Flying Service has purchased the three Wacos of the What Cheer Airways, Inc., at Pawtucket, and has leased the What Cheer field for a period of three years. Included in the lease is the six-plane hangar and the administration building. The action of the Curtiss company is expected to have a direct bearing on the sale of this airport to the state, because for many weeks officials of that company have been inspecting Rhode Island sites. They finally chose the Pawtucket field as the best of them all.

A bill is now pending in the State Legislature for the creation of a commission empowered to purchase and develop a state owned airport with the $300,000 bond issue approved by the voters last election. The bill setting up this commission has already been passed by the senate but is being held up in the house. In the house both will be acted upon at the same time.

CONNECTICUT NEWS

By L. R. P.

THE Danbury Flying Club has contracted for a New Standard five-place passenger ship and is casting sheep's eyes at the New Standard two-place training job—all this despite the fact that the Danbury Field needs a couple of major operations performed on it before it can place in the Department of Commerce alphabetical list.

Mayor Sunderland and a little group of war-time fliers are getting busy, however. A ground school with about 50 members is taking instruction from one of the "L and H" men at Hartford; and enrollment in the flying club is up around 100.

LAKE CANDLEWOOD, the summer colony just north of Danbury, will have week-end air taxi service to New York City this summer. Curtiss Flying Service is handling the schedule and will put a Sikorsky into service.

THE new Beetle of the Kimball Aircraft Corp., at Naugatuck, has been coming off the block in such good shape that it was decided to see what it would do if put in a plane and given the gun. Accordingly, one is being mounted on a little Challenger at Bethany Field.

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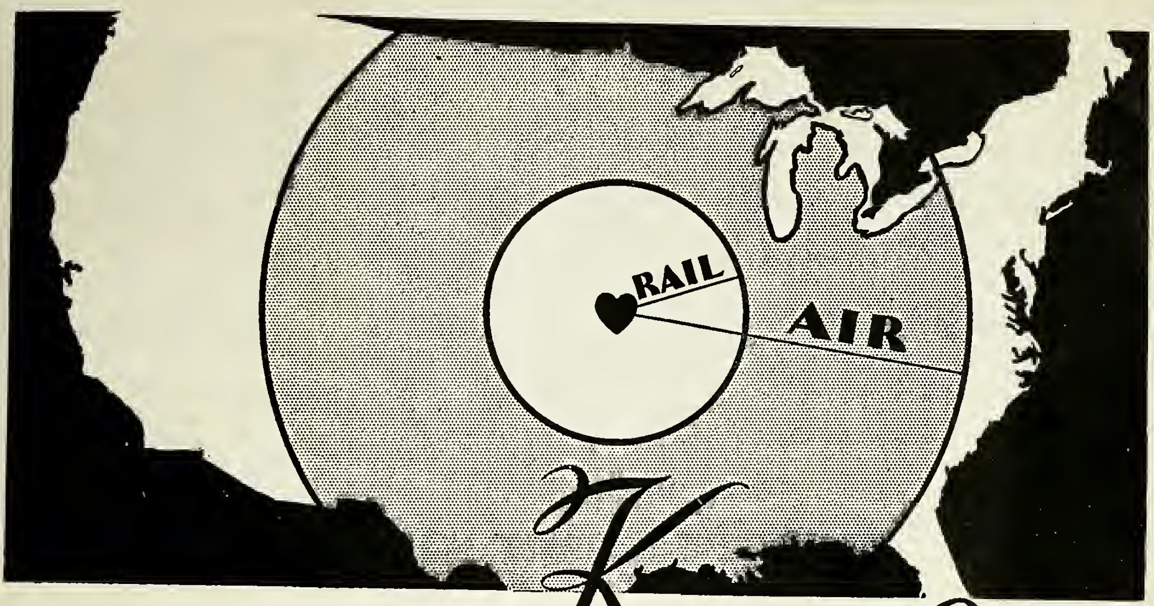

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with Air Mail Pilots

GIVE US MEN! *Give Us* MEN! This was the faint cry of aviation a few years ago. *Today* the commanding voice of aviation is . . . Give us *properly trained* men . . . Give us *properly trained* men!

Texas Air Transport, Inc., and other T-A-T companies today need more men—*properly trained* men—to take the controls of the large fleet of T-A-T Air Mail and passenger planes . . . and pilot the aviation industry to its heights of success.

It is hard to get *properly trained* men. So pressing have been our needs that we determined to establish the T-A-T Flying Schools, to assure the *five T-A-T companies* pilots and mechanics in whom we can place the utmost confidence. These five companies comprise the largest Air Line Operators in America, flying 2950 miles daily, over our four Air Mail Routes, in addition to the passenger lines already in operation. These companies now have openings for the best qualified graduates of the T-A-T Flying School.

When there are no openings for graduates in the ranks of these five companies there will be many other good positions waiting for T-A-T trained men. The U. S. Air Service alone has announced that 330 civilian pilots will be offered commissions this year.

T-A-T pilots have flown more than 533,918 miles without loss of mail or injury to passenger, plane or pilot.

Texas Air Transport America's Greatest

With the merger of the Gulf Air Lines, Texas Air Transport Companies have become America's foremost Air Line Operators.

Texas Air Transport planes carry U. S. Mail 2950 miles every day, from Atlanta, Georgia, to Brownsville, Texas (where connections are made with Mexican National Air Mail Routes), and North to Fort Worth and Dallas, Texas. Seven new passenger lines are being established throughout Texas.

The five T-A-T companies consist of Texas Air Transport, Inc., and Gulf Air Lines, contractors for Air Mail Routes 21-22-23-29; T-A-T Flying Service, Inc., operating seven passenger lines; Texas Aeromotive Service, Inc., offering repair and maintenance service throughout the South; T-A-T Flying Schools, Inc.

NEW, Safe Training Planes

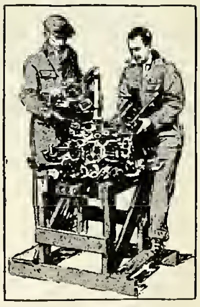
T-A-T Training planes are all NEW and represent the utmost in reliability and performance. Dual control open Travel Air and Curtiss Robin dual control cabin jobs are used in primary flying. Advanced flying gives you the use of Stinson, Ryan, Travel Air Transport monoplanes and many other types.

Instructors

Flying Instructors are all *active* Air Mail Pilots, who have achieved a record unequaled in the industry, having flown more than 533,918 miles without injury to passenger, pilot, ground force or plane. They are veterans in the aviation industry and were chosen as instructors because of their special ability to impart their knowledge. These men know the science of aviation, and have this knowledge seasoned with years of varied experience . . . *and* DAILY flying over the Texas Air Transport routes. At T-A-T you'll learn in addition to the science of aviation—and how to properly and efficiently pilot and repair many types of ships—the hundreds of "*tricks of the trade*" that only veteran Air Mail pilots can give you.

Ground School Courses

Qualified Specialists conduct the class room courses. Text books are studied, lectures are given . . . then you are allowed to *actually do yourself* the things you have been studying. The five T-A-T courses offered range from $250 to $650.



Licensed mechanics supervise students' work in our completely equipped shops where T-A-T planes are serviced.

Come to T-A-T Flying School where you'll get thorough training by America's largest Air Line Operators. Where ideal climatic conditions are found the year round. Where living costs are low. Fill out the coupon NOW for the completely illustrated handsome T-A-T catalog giving full details.

use this **Coupon**

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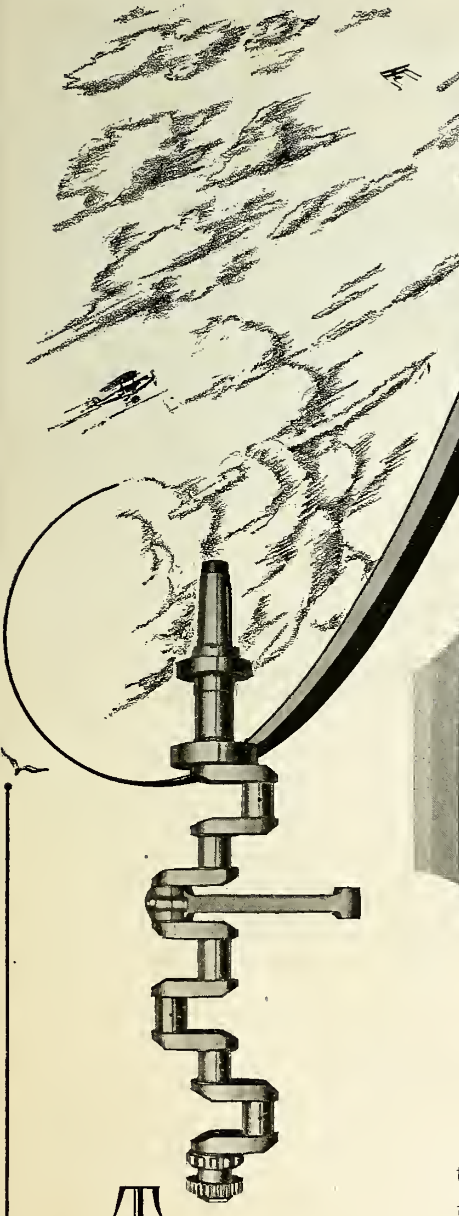
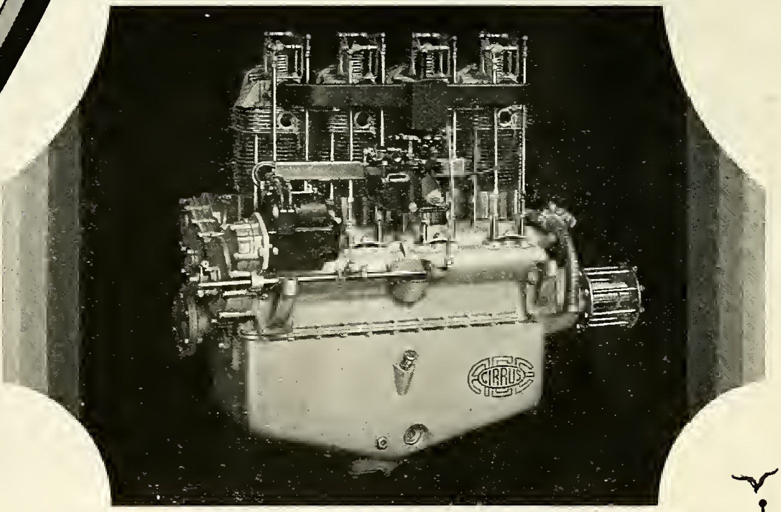


THE AMERICAN CIRRUS MARK III

Simplicity the Key to Confidence



Three-quarter rear end view

This crankshaft, is, without doubt, the most strongly constructed crankshaft in the world for a light aircraft engine.

EQUAL in importance with the extreme reliability of the American Cirrus Mark III is its simplicity of construction. Built to a well-known and conventional design, its operation is easily understood by a student or private flyer. The engine in its simplicity, creates a confidence in the pilot to control and maintain it as he has already controlled and maintained his automobile engine. This confidence is invaluable to any pilot, especially the amateur. It lends itself to top or complete overhaul with a minimum of cost and no further skill is needed for the care and maintenance of the engine than that required for the engine of a motor car.

AMERICAN CIRRUS ENGINES, INC.

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Roy Morris School of Aviation

ROY F. MORRIS, Manager
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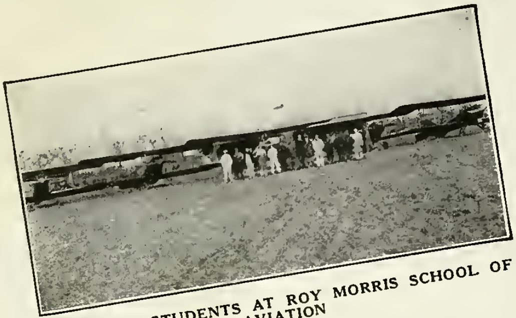
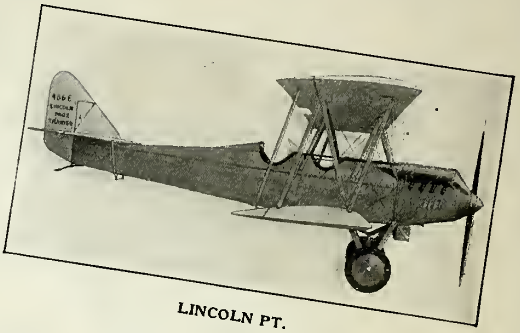

GROUP OF STUDENTS AT ROY MORRIS SCHOOL OF AVIATION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Standardizing on the Lincoln PT (Page Trainer) for Their Student Training

ROY Morris School of Aviation, Topeka, Kansas, is one of the largest and fastest growing flying schools in America, with students from almost every state. Give all flying instruction from Topeka's Municipal Airport. Use latest type planes that are new and safe, with instructors of middle age and years of experience. Classes and shop work held in building formerly largest automobile salesroom in Topeka in the heart of the business district.

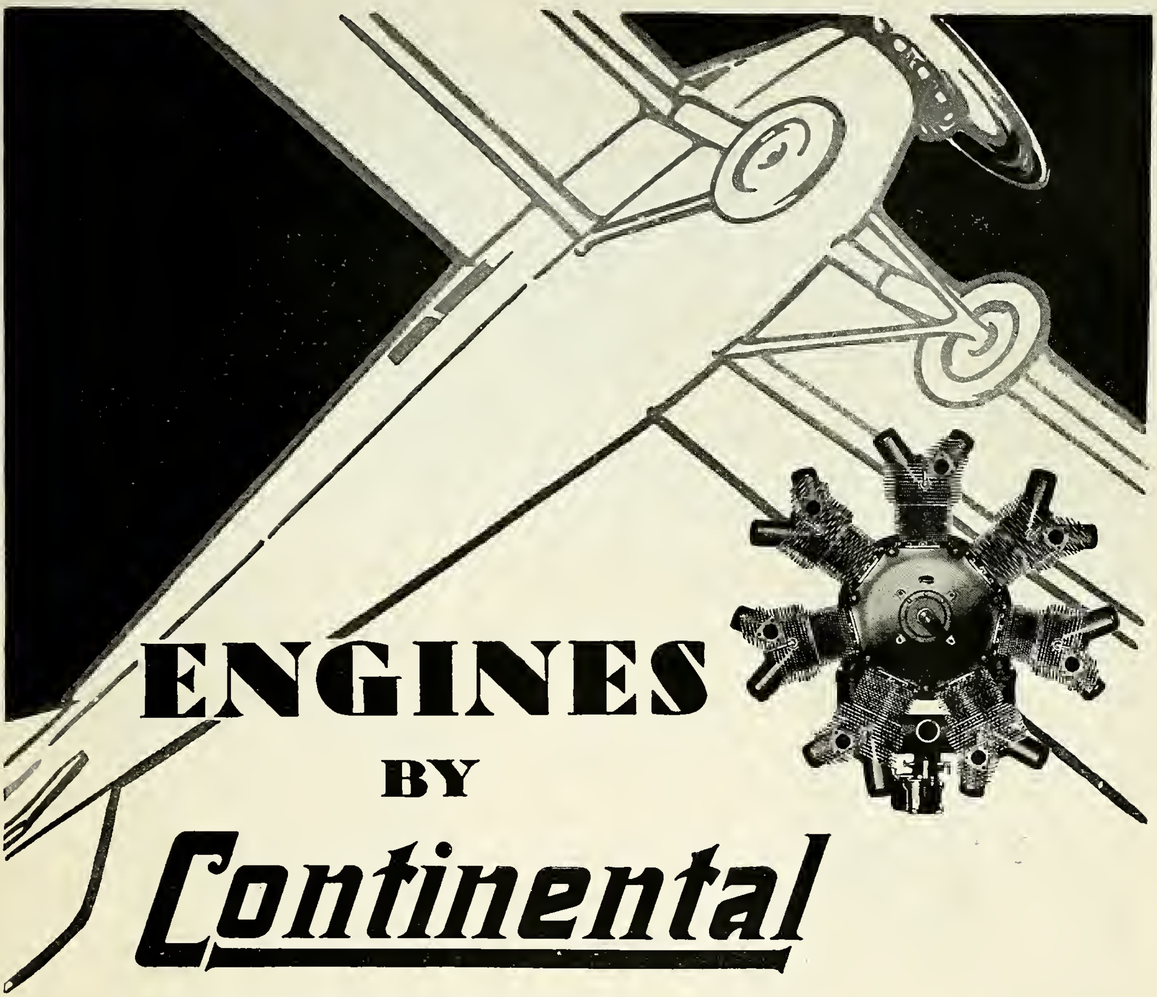
Specifications of Lincoln PT

Type	Tandem Open Cockpit Biplane
Length over all	23 feet, 7½ inches
Height over all	8 feet, 10 inches
Wing span, upper	32 feet, 3 inches
Wing span, lower	31 feet, 9 inches
Chord both wings	58 inches
Wing area including ailerons, upper	153½ sq. ft.
Wing area including ailerons, lower	144 sq. ft.
Ailerons area	30½ sq. ft.
Rudder area	8½ sq. ft.
Fin area	3.2 sq. ft.
Stabilizer, area (adjustable from cockpit)	22.4 sq. ft.
Elevator area	20.6 sq. ft.
Split type landing gear—Nickel steel axles	
McWythe Streamline wires	
Weight empty (with OX5 engine)	1270 pounds
Useful load	395 pounds
Gross weight loaded with OX5 engine	1800 pounds
Power plant	OX5 or any engine from 80 to 110 H.P.
Performance	High Speed 105 M.P.H.
Landing speed	Under 30 M.P.H.
Cruising speed	95 M.P.H.
Climb at sea level	800 feet per minute
Absolute ceiling	15,000 ft.
Cruising range	300 miles
Fuselage construction	Welded tubular. all members of Chrome Molybdenum—modified Warren Truss
Wing construction	Spruce Spar, Basswood Ribs, Grade "A" Fabric
Instruments	Dual or visible from either cockpit
Gasoline capacity	30 gallons with 5 gallons reserve
Radiator shutters	Choke control from either cockpit
Bloxham Safe-T-Stick in student cockpit	Tool compartment

Price $1,985.00 less engine and propeller, at Lincoln, Nebraska

LINCOLN AIRCRAFT COMPANY, INC.

VICTOR H. ROOS, President
LINCOLN, NEBRASKA



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BY
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WITH the entire world rapidly becoming air-minded and an ever-increasing use of the aeroplane as a carrier of mails, freight and passengers, there is a greater responsibility than ever being placed on the engineering shoulders of Continental. As the world's largest producer of internal combustion engines, Continental brings to the air industry an unequalled combination of facilities and experience of vital interest to this newest of industries. The phrase "Engines by Continental" has become a synonym for flexibility, dependability and safety.

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AERONAUTICAL DIVISION
Office and Factory: Detroit, Mich., U. S. A.

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Powerful as the Nation
AMERICA'S STANDARD

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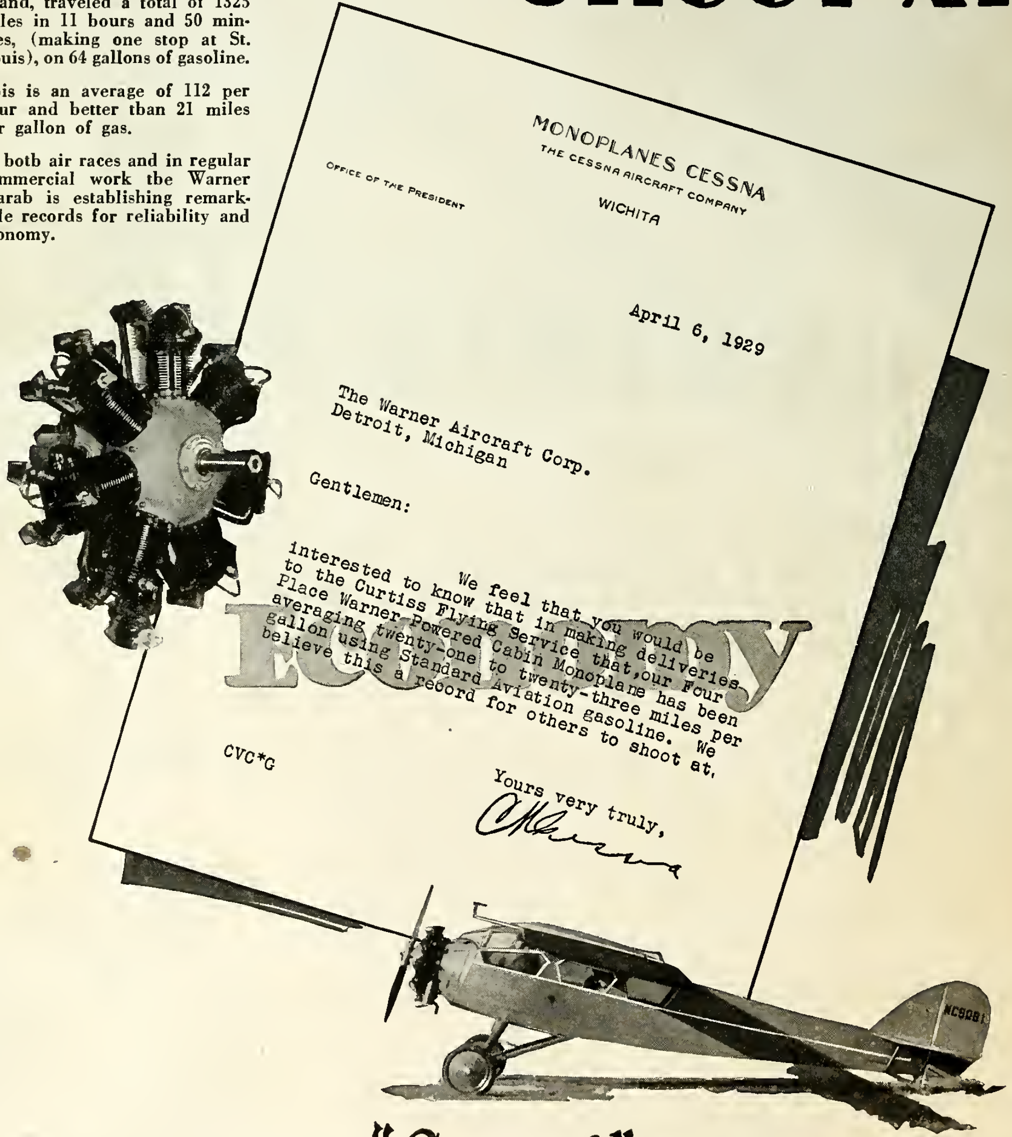
THE Scarab

A RECORD *to* SHOOT AT

A Warner Scarab-equipped Cessna, flying from Wichita, Kansas, to Curtiss Field, Long Island, traveled a total of 1325 miles in 11 hours and 50 minutes, (making one stop at St. Louis), on 64 gallons of gasoline.

This is an average of 112 per hour and better than 21 miles per gallon of gas.

In both air races and in regular commercial work the Warner Scarab is establishing remarkable records for reliability and economy.


Economy
NC9281

MONOPLANES CESSNA
THE CESSNA AIRCRAFT COMPANY
WICHITA

OFFICE OF THE PRESIDENT

April 6, 1929

The Warner Aircraft Corp.
Detroit, Michigan

Gentlemen:

We feel that you would be interested to know that in making deliveries to the Curtiss Flying Service that our Four Place Warner-Powered Cabin Monoplane has been averaging twenty-one to twenty-three miles per gallon using Standard Aviation gasoline. We believe this a record for others to shoot at.

Yours very truly,

CVC*G

WARNER *"Scarab"* ENGINES

—not a Flying School, but a Specialized Training that fits men for those positions in the Aviation Industry where Opportunity is Greatest

ONE of the most serious problems which the aviation industry faces today, is the scarcity of trained men to design, stress, inspect and supervise the construction of planes, to lay-out and manage airports, to control air traffic. The U. S. Aircraft Engineering School, the first of its kind in the country, offers you this important training—knowledge necessary to break into the industry, knowledge that starts you on the career of an Aeronautical Engineer.

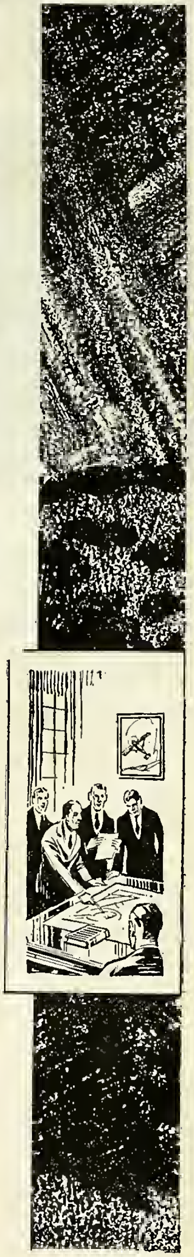
Previous Experience Unnecessary

No matter in what capacity you are employed today—student or employee, experienced or inexperienced in aviation—you can fit yourself for one of these responsible positions. The U. S. Aircraft Engineering School offers you a course of training—in either day or evening classes—consisting of simplified, practical, easy-to-grasp lessons and lectures, based on the foremost authorities in the industry and given by men who have had years of actual experience in designing, stressing and building planes.

To students this course offers a groundwork of fundamentals that will enable them to enter the industry at a good salary, a foundation upon which they may build, dependent only on their own ability. To pilots it offers enlarged possibilities, the technical knowledge through which they may capitalize upon their practical experience. To men in any position in life who wish to better themselves, it offers the opportunity of getting in on the ground floor of the world's fastest growing industry.

Opportunity Awaits Trained Men

For such men—possibly for you—we hold the key that unlocks the door of opportunity in aviation. Your investigation is invited. Write *today* for our FREE Booklet which tells about our course in detail, the possibilities open to our graduates, the unusual service we render. Mail the coupon below *now!*



U.S. AIRCRAFT ENGINEERING SCHOOL

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Kindly send me your Free Booklet "The Key to Opportunity in Aviation" and tell me how I can profit by taking your course.

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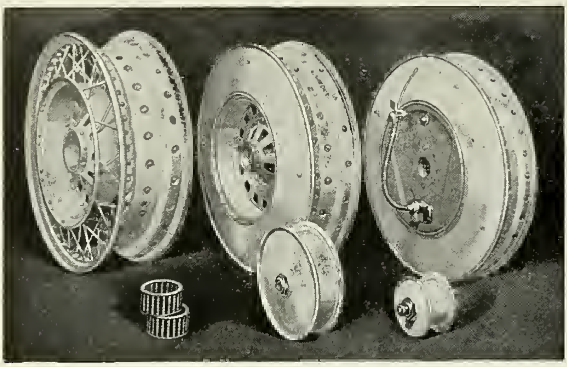
Public Confidence



Safety, dependability and value in airplane manufacture are reflected through the type and quality of visible equipment. Public confidence cannot be bought . . . it must be earned through an apparent desire to provide the utmost in safety and reliable performance.

The indorsement of leading aircraft manufacturers, as well as commercial and private operators, proves without a doubt the confidence and preference gained for Aircraft Products Corporation through their earnest endeavor to furnish not only good reliable equipment, but equipment that is as near to mechanical perfection as it is possible to produce.

The Aircraft Products Corporation are specialists in the design and manufacture of Airplane Wheels and Brakes—Oildraulic Shock Struts—Axles and Complete Undercarriages—Tail Wheel Assemblies—Airplane parts and special fittings . . . The name of Aircraft Products Corporation on airplane parts is a seal of quality materials and a mark of the manufacturing perfection which insures that unerring operation so essential in aircraft performance.

AIRCRAFT PRODUCTS CORPORATION OF AMERICA
DETROIT, MICHIGAN
Manufacturers of Airplane Parts and Special Fittings.

Aircraft Products
CORPORATION
OF AMERICA

PEACE AND ITS PRICE

(*Continued from page* 50)

has a finger which ought to be kept stirring. When all is said and done, disarmament is an attempt to bring armies and navies down to safe and sensible proportions. Now there is certainly no sensible man who thinks or says that our air force is disproportionately large. It may be, it is true, larger than that of Siam or Monte Carlo or Armenia, but that has really nothing to do with the case. When I buy a pair of pants, I don't worry much as to how they would look on my five-foot neighbor. My pants have to fit my own perpendicular proportions. In the same fashion our air force ought to fit our needs; it ought to fit our long-drawn coast line, our wide-spread area, and our national pocketbook. It doesn't do anything of the sort. It looks more like a breechclout than a full pair of pants; a nice little breechclout, but that's all.

If the fashionable fury for disarmament starts to whittling at our air force, everybody with a sense of proportion ought to rise up and holler. And those with some sane idea of the intent and possibilities of disarmament ought to insist that it is above all a matter of proportion, and that it is as right and sensible to bring our air strength up to where it should be as it is to curb and prune to decent proportions the extravagance of a competitive navy.

Out of the present muddle, the world may one day come to sense. Certainly there seems to be a comforting anxiety to do so, and it is not impossible that the most pig-headed peoples in the world may tire at last of keeping overfed armies and navies on the payroll, to eat their own heads off in times of peace and blow each other's heads off in times of war. The nations may, in fact, grow up, and learn to behave with the decent tolerance of adults instead of with the swagger of small boys. When and if that time comes there will still be armed forces of land, sea and air, but scaled to a nation's need and not to its pipe dreams.

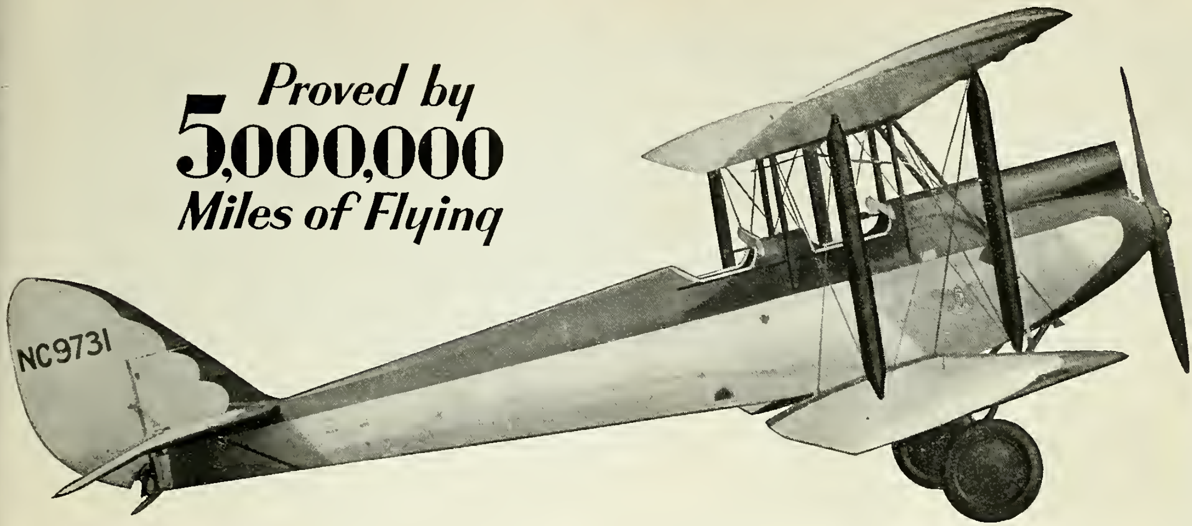
We do so in our private affairs, and may yet learn to do so in international affairs. I don't go down town in a suit of armor, swinging an iron club studded with spikes and with a ten-foot lance tucked under my other arm. I content myself with a straw hat and an umbrella, and an inside pocket for my three dollars in cash money. It isn't only the law that makes me comparatively safe with such simple precautions; it's the fact that no business can be done unless the majority of men are willing to give each other a fair break. The wide world is fast becoming a market of business corporations, large and small, and there is real hope for a fair average of peace in the plain fact that no business can be done without some generally accepted code of conduct to guide and regulate it. And the day must come at last when armaments will be scaled down by common consent to provide protection first of all, and any nation that goes far beyond that will be outlaw to an unwritten code. And when an outlaw is recognized and identified, something can usually be done about it.

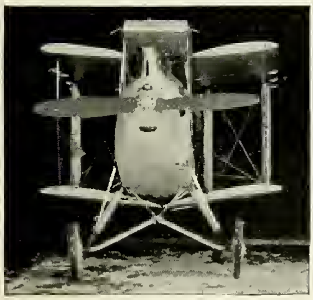
Just where does the airplane fit into this question of armament and disarmament? It's a very interesting question, and one that needs an answer before we know what to reply to the pacifist plea that we junk everything that looks like a fighting machine. Is an air force no better than another burden on the back of a public that is tired of war? Is it just another cause and occasion for a fight, another temptation to throw a brick at our neighbors?

We don't think so, and shall try to prove it without using any seventy-five cent words. We think, indeed, that the plane is the most promising sign of world peace to come,

(*Continued on next page*)

Proved by 5,000,000 *Miles of Flying*



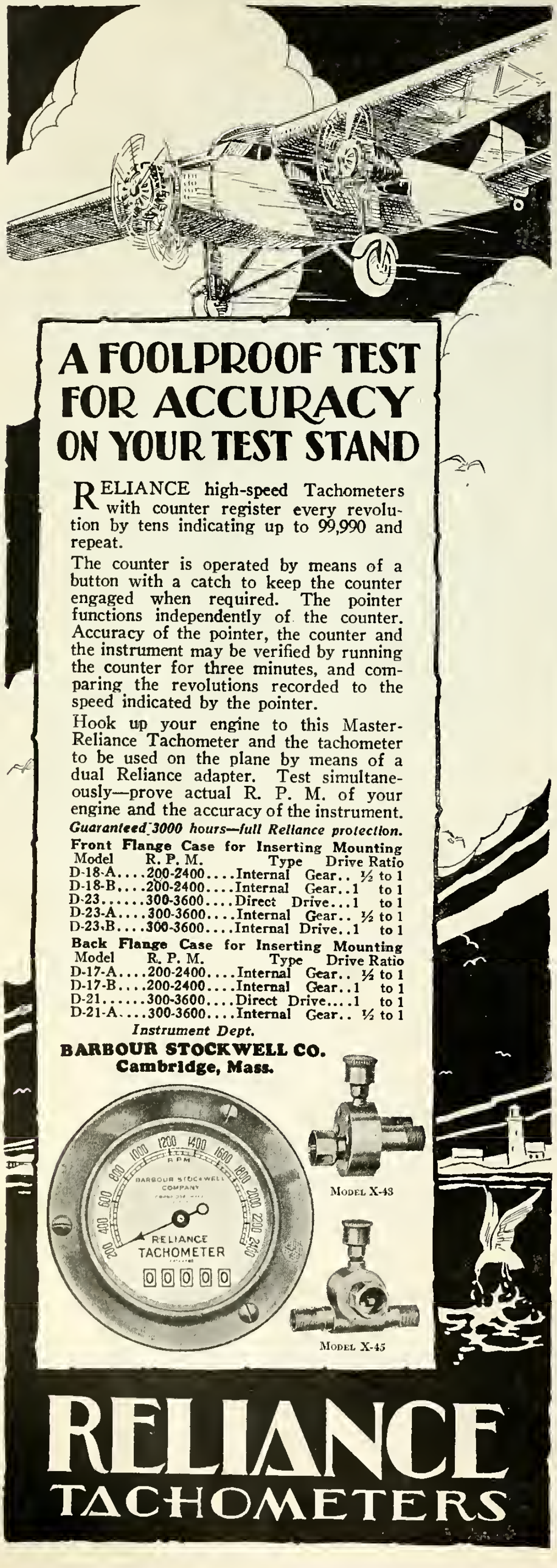


Folding wings *permit storing the Moth in a single-car garage. Commercial users can store three Moths in space occupied by one ordinary plane, resulting in large savings in hangar rent.*

THERE are other planes that look like a Moth, but there's no other plane that flies like a Moth! ◆ ◆ The Moth has the stability of a large ship, the maneuverability of a pursuit plane, and landing qualities that are unequalled. The reserve power of the famous 100 H. P. Gipsy Engine enables a student or flyer to get himself out of trouble quickly and easily. The differential ailerons, the large control surfaces, and the famous slotted wings give stability and safety that no other plane can match ◆ ◆ It's impossible to put a Moth into an unintentional spin. Capt. de Havilland deliberately stalled a Moth at 200 feet and let it sink to the ground with the stick full back. He landed safe and unhurt. No one has ever been injured in a Slotted Moth. ◆ ◆ Such flying qualities and safety cannot be achieved hurriedly. The Moth was designed 5 years ago by Capt. de Havilland. It has been constantly refined and perfected through the experience gained in 5,000,000 miles of flying. ◆ ◆ Fly a Moth, and you'll agree it's the greatest two seater on the market! ◆ ◆ Booklet and full information will be mailed to prospective owners and dealers on request.

MOTH AIRCRAFT CORPORATION
LOWELL, MASS.
LICENSEE, THE DE HAVILLAND AIRCRAFT CO., LTD.

D.H. *Gipsy* MOTH



A FOOLPROOF TEST FOR ACCURACY ON YOUR TEST STAND

RELIANCE high-speed Tachometers with counter register every revolution by tens indicating up to 99,990 and repeat.

The counter is operated by means of a button with a catch to keep the counter engaged when required. The pointer functions independently of the counter. Accuracy of the pointer, the counter and the instrument may be verified by running the counter for three minutes, and comparing the revolutions recorded to the speed indicated by the pointer.

Hook up your engine to this Master-Reliance Tachometer and the tachometer to be used on the plane by means of a dual Reliance adapter. Test simultaneously—prove actual R. P. M. of your engine and the accuracy of the instrument.

Guaranteed 3000 hours—full Reliance protection.

Front Flange Case for Inserting Mounting

Model	R. P. M.	Type	Drive Ratio
D-18-A	200-2400	Internal Gear	½ to 1
D-18-B	200-2400	Internal Gear	1 to 1
D-23	300-3600	Direct Drive	1 to 1
D-23-A	300-3600	Internal Gear	½ to 1
D-23-B	300-3600	Internal Drive	1 to 1

Back Flange Case for Inserting Mounting

Model	R. P. M.	Type	Drive Ratio
D-17-A	200-2400	Internal Gear	½ to 1
D-17-B	200-2400	Internal Gear	1 to 1
D-21	300-3600	Direct Drive	1 to 1
D-21-A	300-3600	Internal Gear	½ to 1

Instrument Dept.
BARBOUR STOCKWELL CO.
Cambridge, Mass.

MODEL X-43

MODEL X-45

RELIANCE TACHOMETERS

(*Continued from preceding page*)

principally because it makes ridiculous the old notion of hard-boiled boundaries between peoples, of spite fences and barbed wire, of the idea that the folks on the other side of the hedge are so fundamentally different than ourselves that it is our duty to snub, despise or exterminate them. Study over your history and see what transportation and communication have done already for peace. It's not long ago, in terms of world history, since every castle on a hilltop was at war most of the time with every other hilltop in the neighborhood. To make things more interesting for the innocent bystander, the woods were full of bandits and outlaws engaged in small wars of their own, so that a traveler was a bad risk unless he went in company of an expeditionary force of his own. Pirates scuttled round the sea, so that it was one thing to start a trip abroad and quite another to finish it in good condition. All this became intolerable when good roads came into fashion, and was soon thereafter a thing of the past. Another illustration of the same law in operation is the history of Rome's empire. The Roman peace was founded on good roads kept open for business, and the empire and the peace both collapsed when transportation and communication were neglected.

You remember when every principal American highway was a turnpike. The automobile wiped out the toll gate, for the "Stop and Pay Toll" sign was an irritation, obstruction and offense to quick communication and transportation. Always the tendency is that the widening range of travel and communication results in the elimination of petty differences and annoyances and an increasing sense of neighborliness among men. Now comes the airplane, and skims across the last natural and unnatural boundaries. In Europe it is already forcing the elimination of irrational and annoying customs differences and making artificial boundaries of no effect. In this hemisphere it is recogized as the real goodwill messenger between the New World nations. Because it can travel more widely and quickly than anything yet devised by the mind of man, it has become a real dove of peace as well as a bird of passage.

But what about its war habits? For the plane can be made a particularly vicious fighting beast and even the Navy knows it. And the peace-at-any-price pacifists are very ready to warn us that the increasing speed and mobility and deadliness of the plane may make a bad condition worse by giving men a new and frightful fashion of converting each other into a total loss. They go so far as to ask that disarmament be worked out at the chief expense of aviation, even though meanwhile the Navy continues to spend the nation's money on a bigger scale than ever. They want us to clip our wings before they are anywhere near full grown.

If the fighting air force is to be considered as nothing but an additional left foot of the Army or the Navy, the disarmament theorists are probably right. The world's armies and navies are too big already. When a man or nation is strutting around with three six-shooters, a tomahawk, a meat knife, a machine gun, and two blackjacks, it doesn't help his peaceful appearance to add anything further to his equipment.

But let us contemplate briefly the special nature and disposition of the fighting airplane. Since the day long ago when H. G. Wells wrote "The War in the Air" to the last technical treatise on military tactics, it has been realized that although a bombing airplane can blow a city into a

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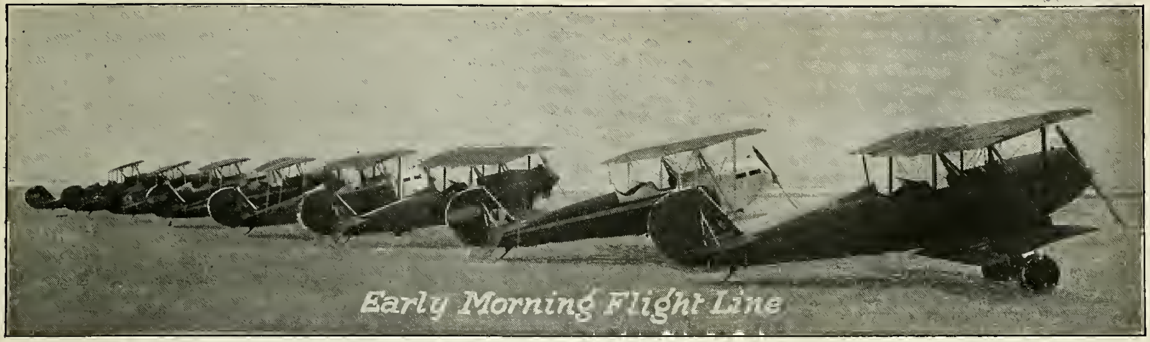
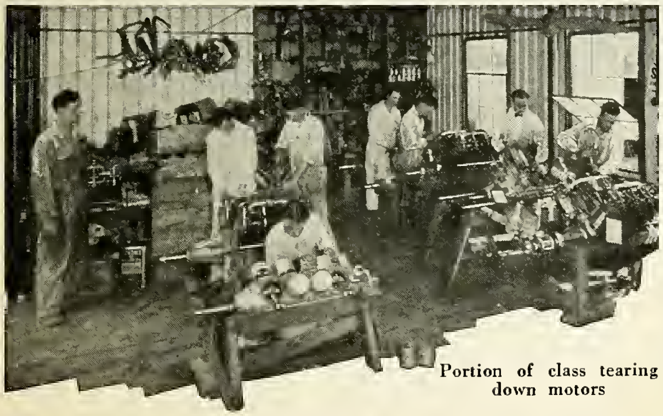


Early Morning Flight Line

Only *Complete* Training Makes Aviation Success



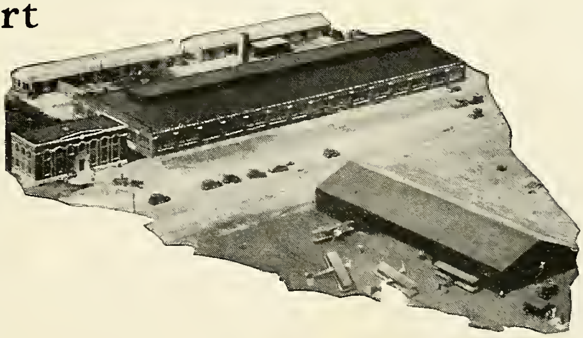
Portion of class tearing down motors

Aviation offers you big money—a chance, too, for fame and adventure, only if you are completely trained for the job you take. You must know aviation from the ground up. No other kind of training will win.

PORTERFIELD offers you the most thorough ground school and flying instruction—any ambitious man can learn under our practical training system. Here you learn by doing actual work. You actually build up and tear down latest motor types, dope wings, rig ships, study instruments, etc. Whether you become a pilot or ground worker, PORTERFIELD gives you the combination of theory and practical training that quickly and thoroughly qualifies you for Department of Commerce licenses.

ALL LATEST EQUIPMENT Aviation progresses rapidly. By all means, select for your training an institution that is fully equipped with all latest developments. Being up-to-date, the PORTERFIELD graduate is in constant demand among distributors, factories, passenger lines, etc.

Nationally Known Instructors At a Big Airport



Men who teach you AVIATION at PORTERFIELD are nationally-known as experts. Not built around a single individual—a balanced organization with a sincere interest in the success of every student. You are taught at FAIRFAX Airport, known as one of the finest in the country. Here you are right in the heart of this wonderful, new industry—the real place to learn.

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Simply send name today for our big illustrated book, "A Flying Message." Gives valuable facts about theory of flight, aerodynamics, motor construction and operation, map-making, etc. Tells you how to select your training and how to enter the industry. Write for it today by all means—the request puts you under no obligation.

PORTERFIELD FLYING SCHOOL

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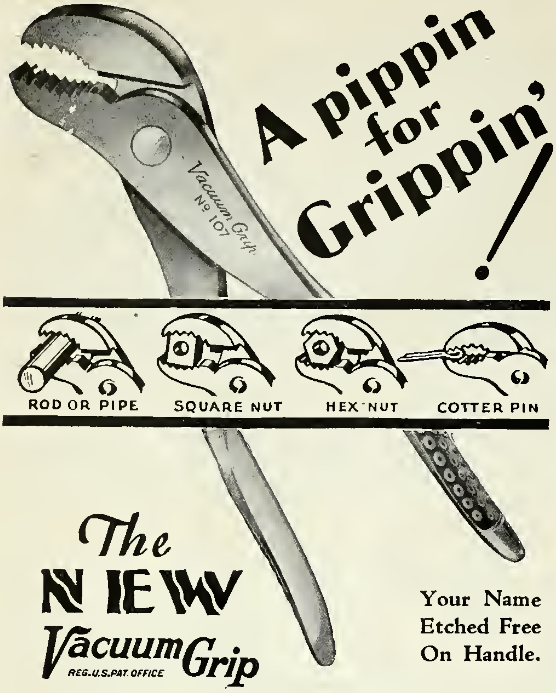

The NEW Vacuum Grip REG. U.S. PAT. OFFICE

Your Name Etched Free On Handle.

ANGLE-NOSE GRIPPERS

A DOZEN types of gripping pliers and a dozen wrenches *in one pair of pliers*—the NEW Vacuum Grip No. 107 Angle-Nose Pliers for aviators and aero mechanics.

Useful in a hundred different ways: for tightening tie rod terminals; work on tubing, bars, pipes and fittings; strut and cable adjustments; crank case housing and cylinder nuts; spark plugs; battery terminals, cotter pins, etc., etc.

Adjusts itself to any shape as readily as the human fingers. Special milled teeth—set at Stillson-wrench-slant—provide a sure-hold grip. "Eagle beak" head gives added gripping power to the jaws.

The 45° angle nose gets into the hard-to-reach places. Has adjustable joint for work up to ¾ in. diameter. Full-fashioned non-slip "Vacuum Grip" handles, with fulcrum placed at point for tremendous leverage.

Unequalled for strength and durability. Hammer forged from F.S.P. special analysis alloy tool steel. NOT CASE HARDENED, but hardened and tempered *to the core.*

No. 107 Angle-Nose Grippers
Length 7 in. Price $2.00

Should be in the kit of every aircraft and aircraft mechanic

More than a "handy" tool—a tool that will instantly become essential to your daily work. If your dealer can't supply you write us direct. We pay parcel post. Don't take a substitute.

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NEWPORT, PA.

(*Continued from preceding page*)

housewrecker's dream, the pilot cannot capture said city and put it under the back seat. You cannot occupy territory with airplanes, though you may intimidate governments and scare populations into a temporary surrender. You can do an infinite amount of damage, provided the other fellow has no airplanes with which to argue the point, but you can't justify that damage, even in a military sense, by taking proper possession of the pieces.

Supposing, for the sake of argument, that the nations see the light or have good sense crammed down their throats by economic necessity, and thereupon reduce their armaments to the point where they seem reasonable. Suppose it dawns upon them at last that the old-fashioned armaments are little good anyhow, now that they can be harried and blinded and bullied and exterminated from the air. What happens next?

We need to assimilate a little more history in order to find a likely answer. We need to recall that there have been leagues and confederations and covenants for peace in the world for at least six centuries, and that, by and large, they haven't worked. They have sometimes worked to keep a bad-tempered nation from going off the handle and committing an outrage, but they have rarely if ever prevented an ingenuous nation from managing a war under the excuse of the most peaceful intentions. There was, for example, the phrase of "peaceful penetration," which meant that an army slid into somebody else's backyard and then declined to get out unless thrown out. There is the old gag of "temporary occupation in order to preserve order." There have been all sorts of international crimes committed under the excuse of peaceful colonization. Even in the last great war, practically all the nations went to war talking loud and long about peace. And nobody could do anything about it.

What difference may we look for when the federation of the world is an actual fact, even though it have another name? We may expect, it seems, that land and sea forces will be toned down to proportion. We may expect that aerial forces will be much greater than they are now, principally because there's no real difference between a peace plane and a war plane except that the latter carries a gun or bomb. But there will also be this difference. When an aerial fleet of fighting ships start out over somebody else's territory, there will be no argument as to what its intentions are. It will be out to do damage, either from revenge or territorial ambition or plain appetite for trouble. It will be out on a war of aggression and it will be extraordinarily difficult to disguise it as anything else, since—as we have suggested—the fighting airplane is built to do damage and can do very little else. To make a domestic parallel, my neighbor can squat on my land or steal my vegetables or make himself too much at home on my side of the boundary line or allow his hog to root in my rose garden, and it may be quite difficult to prove that he means me no harm. But if he throws a brick through my window I know at once what he means and so does everybody else.

There will probably always be occasions when something like this happens in international affairs. But it does seem that public opinion—which works just as surely in world affairs as around the old town pump—is more and more disposed to condemn the trouble-seeker, the bad boy who throws stones, the man with the chip on his shoulder, the bully and the bandit. When the armaments of the world are principally air armaments aggressive warfare will lose all its disguises and alibis. By the same token, the right of defense will be established and supported by all thinking men and nations. And thereby the probable chances of

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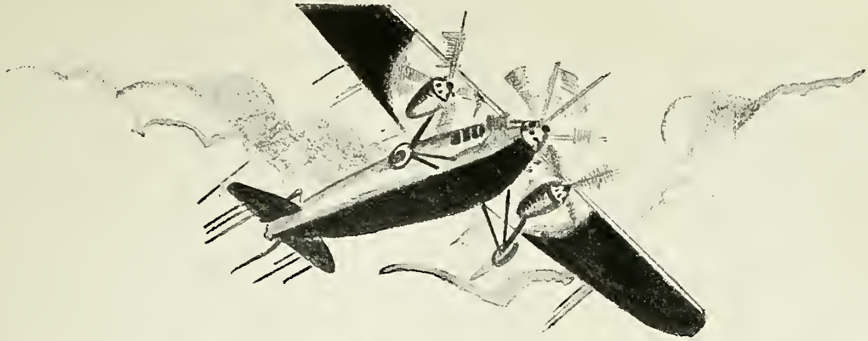
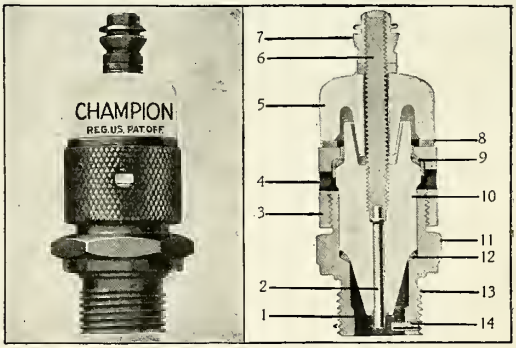


CHAMPION

the Better Spark Plug for every Aircraft Engine



Long supreme wherever spark plugs are of vital importance, Champion has now given to the aircraft engine a revolutionary new spark plug, based on over two years of research, experiment and testing. Designed and built exclusively to aircraft specifications and needs, the new Champion Aero Spark Plugs daily bring a new factor of safety and dependability to an ever increasing number of aircraft engines.

Champion Aero Spark Plugs are so designed that it is practically impossible to break them in such a way as to interfere with engine operation. Their ability to withstand tremendous pressures and temperatures is combined with the ability to withstand a maximum amount of oil.

Sillimanite, nature's finest insulating material, which is exclusive to all Champions is used in both the primary insulator and the protecting "dome" insulator. Its superior strength and remarkable ability to withstand heat and electrical shock not only insures maximum safety against breakage at the terminal end, but also assures dependable ignition under all conditions at the firing end. These are special attributes of inherent design exclusive to Champion Aero types.

Although Champion Aero Spark Plugs are a departure from standard design, they retain all the exclusive features of Champion two-piece construction, new gas-tight copper gaskets and special analysis high compression electrodes.

Exceptional care and the finest workmanship insures in Champion Aero Spark Plugs the paramount requirements in aviation—safety and dependability. Install a set of Champion Aero Spark Plugs in your engine.

Champion Aero Line Exclusive Features

1—Semi-petticoat tip
2—Special analysis electrode
3—Bushing
4—Air Cooling space
5—Secondary dome insulator
6—Steel spindle
7—Terminal
8—Copper seal
9—Upper copper gasket
10—Primary insulator
11—Shell
12—Lower copper gasket
13—Metric threads
14—Ground electrode

Outstanding World's Records Made With Champions

Altitude—38,793 feet, December 21, 1927—Major Renato Donati.

Speed—318.69 miles per hour, March 1928—Major Mario De Bernardi.

Women's Altitude Record—22,500 feet, December 8, 1928—Louise McPhetridge Thaden.

Women's Endurance Record—Twenty-two hours, three minutes, twelve seconds. March 18, 1929—Louise McPhetridge Thaden.

CHAMPION

TOLEDO, OHIO **SPARK PLUGS *for Aviation*** WINDSOR, ONTARIO

DO THIS

and you will obtain the best HANGAR and SAVE MONEY

THE many types, problems involved and claims made for Hangars, makes it essential to obtain reliable information—information that will result in an economical and satisfactory Hangar to you.

For instance, certain types cost many thousands of dollars, are impractically constructed for your constantly changing needs, and will not meet your requirements as efficiently as a far lower-priced, sturdy and scientifically designed steel Hangar.

These and many other important considerations should be known and considered before your decision is made.

ESLINE are pioneers in STEEL BUILDINGS construction. Our engineering department is ready to meet your particular problems—all this without obligation to you.

ESLINE HANGARS are reasonable, most practical and are sold on convenient terms.

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Please send information on Hangar, size..............

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(*Continued from preceding page*)

peace will be increased, which is about all we can ask for in this world of imperfections.

The good sense of the world approves of disarmament, and in many respects America sets the pace for it. Even though the Navy goes on for a while spending half a billion a year, the sentiment of the nation and the world is towards the scaling down of armaments to proper proportions, which is about as far as they can be scaled. But the same good sense approves the program of sufficient aerial defense against the possible bad manners of our world neighbors. If and when a fighting fleet comes out of the sky to visit our shores, it will have come for no good purpose whatever and we must be ready to turn it back or turn in our checks. And the good sense of the world will be on our side when we do so.

We work and hope and pray for peace on earth and goodwill to men. But Senor Salvador de Madariaga, who has served for six years on the disarmament commission of the League of Nations, makes one qualification of this good intention. Goodwill to men,—yes, but only to men of goodwill. For the rest we must be prepared with strength for strength. It is the right and privilege of aviation to make our nation strong for peace and equipped for self-defense. With this we hope will come increasing wisdom and goodwill so that we may remember the rights of others no less than our own. Unless, indeed, such good sense becomes fashionable in the affairs of nations, peace is a dream and delusion and cannot be bought at any price. Just now its price is preparedness, not in cumbersome and burdensome armies and navies, but in the full mastery of the air above and around our homeland.

CY-ZING UP THE AIR SHOW

(*Continued from page 47*)

with airplanes. When Ray got that hall filled with planes, not only could you not have put in another airplane—you couldn't have got in another sardine. Airplanes were here, there, and everywhere. They stuck out in the aisles for you to fall over; they leaned against each other, crowded under and around each other—and I'm not sure but what there was a Monocoupe inside the big Fokker, for storage. Uncle Knute instantly offered Ray 10,000 kroner, or kopecks, a week, to go to Sweden and teach the Canners Association how to do some real packing. Ray might have gone, too, only his arithmetic went back on him and he couldn't translate the 10,000 into American money. What Ray needs is a larger building or fewer airplanes. But he put on a good show and everyone seemed delighted, though crowded.

Just a word to the earnest gentlemen who stand beside the airplanes, ready and eager to deluge us with facts and fancies about the product. Why, when you notice someone staring at an airplane, do you start your conversation like this: "Are you interested in airplanes?" The correct answer to make is : "No, I am not interested. The fact that I have paid 75c. to hurl my suffering form into this mass of people merely proves that I am searching for a place to buy underwear." The answer may be varied by saying: "Not at all—I just happened to commit a murder and thought this would be a good place to hide." A little practice on sales talk would save much needless pain. A young man standing beside one especially inept example of the airplane maker's art began on me like this: "What would you like me to explain to you about this plane?" "Please explain to me how you manage to sell any of them," I replied, and ruined his whole day.

Occasional curses of these shows is the too loud talking

(*Continued on next page*)

THE INVERTED LOOP

Extreme test of structural strength and maneuverability

Like the law of gravity suddenly reversed — that is the condition produced by the "inverted" or outside loop. All stresses on the plane are reversed and terrific centrifugal force tends to catapult the pilot from the ship. So great is the strain on pilot and plane that the stunt is now forbidden in the Army and Navy Air Corps.

Yet Charles ("Speed") Holman of Northwest Airways twice executed this difficult feat at the Detroit Show using a standard Laird-Whirlwind Sport Model.

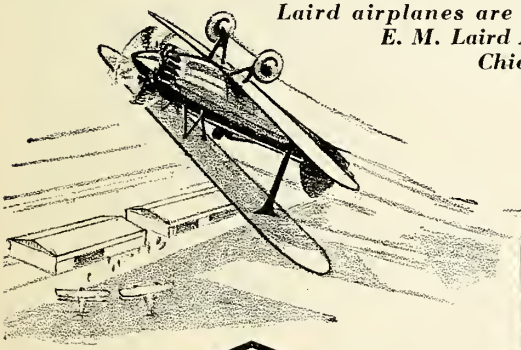
The Laird-Whirlwind is not particularly a stunt plane. It is designed and built for straight commercial and sports flying. Laird performance, however, under the extremely trying conditions of the inverted loop, gives ample assurance of Laird performance in all sorts of weather.

Laird superior design and Laird superior workmanship plus Wright Whirlwind power result in the perfected flying unit.

Laird airplanes are built for the sportsman-pilot and the commercial buyer whose chief interest is high efficiency and dependability rather than price. We invite such buyers to write for our free booklet and the name of the nearest distributor who can arrange a demonstration.

E. M. LAIRD AIRPLANE CO.
Ashburn Field—4500 W. 83rd St., Chicago

Laird airplanes are manufactured only by the
E. M. Laird Airplane Company
Chicago, Illinois



LAIRD PLANES CHICAGO, ILL.

Distributors: Exclusive territories available for established firms with funds and suitable demonstration facilities to handle LAIRD sales. Enlarged factory space and increased production facilities insure prompt delivery.

Chas. "Speed" Holman, and his Laird-Whirlwind LC-R. The same plane and pilot hold numerous records including first place in the Class "B" 1927 Air Derby, the air-mail speed record, and first place, Los Angeles-Cincinnati Air Derby, 1928.

"The Thorough-Bred of the Airways"

TRADE
MADE IN THE UNITED STATES OF AMERICA
WORCESTER, MASS.
MARK

When accuracy counts use Reed & Prince Products

Every Reed & Prince Product meets the U. S. and S. A. E. Standards in strength, finish, dimensions.

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REED & PRINCE MFG. CO.
WORCESTER, MASS., U.S.A.
WESTERN BRANCH AT CHICAGO-121 NORTH JEFFERSON ST.

(*Continued from preceding page*)

demonstrator of some specialty, whose stentorian voice drowns out everyone in his vicinity, and the machine or gadget that makes a continual noise. One chap had a metal-stamping machine that pounded constantly, chopping out chunks of metal. This device so wore on the nerves and the ears of nearby exhibitors that they entreated the demonstrator to shut it down. He, kind fellow, good-naturedly complied, and shut down his foundry. Upon which the harassed auditors then could hear the leather-lunged gent with the mechanical mouse, or sparking hickey, or whatever it was. This lad was tireless and loud, from morning to night. The others stood him as long as they could, and then they begged the man with the foundry to start up again, and drown out the other pest.

We've heard a lot about the air-mindedness of Detroit, and that condition certainly does apply to the citizens. But the same cannot be said for the city council. With a million dollars voted for an airport, they don't know where to put the airport or what to do with the million dollars. Meanwhile Detroit has no municipal airport. If it were not for Mr. Ford there wouldn't be an airport anywhere near Detroit—and Detroit cannot take any credit for Mr. Ford's personal contribution to aviation. Of course, there are several private fields, but they are not airports. Detroit is always behind the times; and the fault lies directly with a muddle-headed city council. However, they have received such an editorial hammering from various Detroit papers and from Detroiters generally that they may be expected, say within ten years, to produce the airport the citizens are willing to pay for.

For the officials and employees of the Ford Motor Co. Airplane Division at Dearborn I wish to express my sincere regard and appreciation. They made us welcome at their airport, treated us with courtesy and consideration, helped us in many ways, and did everything in their power to make our stay among them pleasant. At a time when the airport was crowded with planes, when their own work was interrupted and delayed through our presence, the Ford men helped us cheerfully and gladly, in dozens of ways.

From the unfortunate collision above the airport that wrecked two planes and cost the lives of three good men, we should learn a lesson that would make the recurrence of such an accident impossible at other air meets. For the benefit of the industry and for the safety of pilots I have this suggestion to make: that during a meet the airport should be used *solely* for the purpose of taking off and landing, and that pilots should not use the air immediately above or in the immediate vicinity of the airport for the purpose of demonstrating their planes. It is obvious that with dozens of planes being demonstrated at the same time within a comparatively small space that the air is too crowded and that the danger of collision is increased needlessly. It is equally obvious that if the planes take off and fly for only a few minutes away from the airport to various points of the compass that they will then be well spread out, thus lessening the danger of collision. On the day before the fatal accident that marred the Detroit Show, several of the older pilots commented on the fact that planes were being flown across the path of other planes taking off and landing, flying across the airport in all directions, and even stunting over it—which, of course, is directly contrary to Department of Commerce rules. Airport rules governing each meet should be laid down by the managements and should be rigidly enforced; individual airports with differing characteristics require individual rules. These should be worked out in advance and should be thoroughly under-

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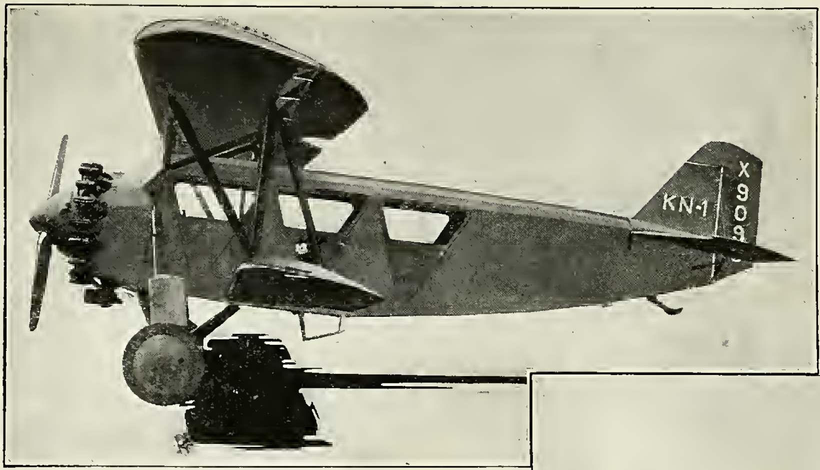
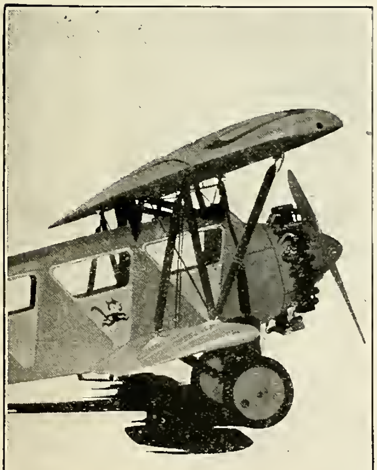


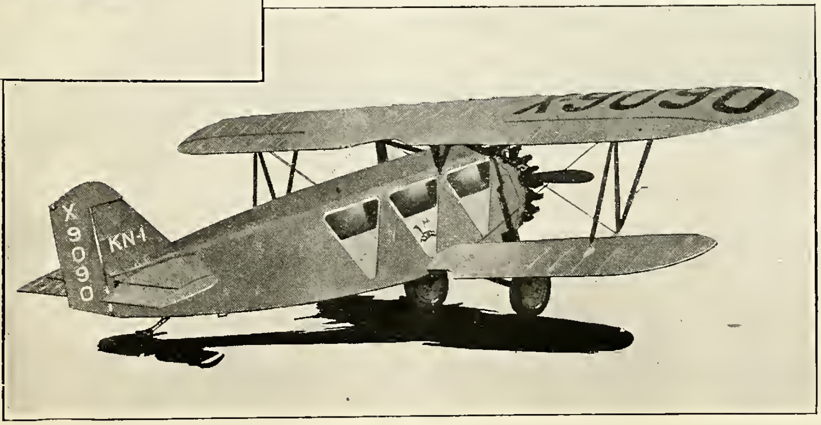
ADEQUATE ENGINEERING

FROM providing a maximum of comfort and convenience for passengers right down to the last little detail of simplifying maintenance and inspection the KN-1 has had the advantage of an engineering staff of established reputation and long experience.

You will be delighted and surprised by many of its unique features—plywood covered wings—the detachable power plant unit—the hundred and one little details that mark it at once as an outstanding design built by an organization that believes in quality and knows how to produce it.



The KNOLL
AIRCRAFT CORPORATION
WICHITA, KANSAS



Aviation Manpower Supplied

Licensed Pilots
Licensed Mechanics
Experienced Aviation Workers

If you need more men—you will find them here. We have a live list of trained workers that was compiled from, around, and for the Industry —for your help.

It completely covers the qualification records of those who have had years of experience on the ground or in the air, and trained newcomers. It represents the best available supply of what must be had to build and fly planes—MEN.

We pick men especially qualified by experience and training to meet YOUR requirements. Other employers have found this service highly advantageous and so will you.

Free Service

These men are given our service without any cost to them. And we are ready to furnish you their names and records—to assist you select the men you want when you want them, without any charge to you!

Write us about your needs for Licensed Pilots, Mechanics, or Trained Specialists. Then decide for yourself as to our ability to serve you as we have others in the Industry.

We can help

Employment Department

Aviation Institute
of U. S. A.

Walter Hinton, President
1115 Connecticut Avenue
Washington D. C.

(*Continued from preceding page*)

stood by all pilots at the meet.

What I have said about flying over the airport does not apply to authorized formation or stunt work performed for the entertainment of the public, but only to the unregulated flying of dozens of planes being demonstrated by pilots, no one of whom can know what the other man is likely to do, or is expected to do. And kindly do not misconstrue my remarks as a criticism of this show or this accident; it is not my province to do so. I merely urge that measures be taken to insure that such an accident cannot occur again; or that if it should unfortunately occur that it will not be before the eyes of thousands of spectators who immediately rush wildly across the field, endangering themselves and pilots who may be landing.

But let us end on a cheerful note; for, after all, life is, in the main, a cheerful thing. Some day, perhaps, you will turn to each other and say, "Poor old Cy—he got hold of the wrong bottle! What sort of flowers do you suggest —cauliflowers?" But then, I would not have you weep for long. What good are tears, regrets? Tears change nothing—except a girl's complexion. So dab on a little powder, if you use powder—and one of my six readers does, she tells me—and come to breakfast with me. I really must invite you to that breakfast to meet Lady Heath and Major Biddlecombe, for Lady Heath is a very jolly sort and Biddlecombe is the famous man who introduced the odd custom, or vice, of eating fried kippers dressed in a Tuxedo. That is somewhat ambiguous. What I mean is, the Major wore the Tuxedo and the kippers wore the scaly covering that Nature in her mysterious way chooses to provide them with. Why she should do this, or, for that matter, why anyone should eat kippers, I do not know. But eating kippers is an old English custom with which I do not quarrel, though I may shudder at it.

Lady Heath invited me to breakfast with her, because I'd been carrying a large trunk around the airport for her for several days, and she really owed me some nourishment. Of course, she didn't call it a trunk, but a handbag, although to me it was a trunk. I insist the huge thing was a trunk, *not* a handbag. Well, she noticed that I was breaking under the strain—and she had told me a couple of English jokes, and I never was strong to begin with—so to make up for this damage she said "Come to breakfast with me!" She said it in English, but I've translated it into American for you.

Well, we started breakfast, and all the time she kept saying, "I wonder where Biddlecombe is—what is detaining him?" "I don't know," I said, "unless he couldn't get his accent buttoned on straight, or something. Don't pay any attention and he'll turn up. Besides there's barely enough sausages for two."

I had just started the first sausage—a little shrivelled up thing that evidently had been killed too young—when in came the bold Biddlecombe and to my surprise and consternation I saw that he was wearing a Tuxedo! Now, a Tuxedo is a garment that no sane man deliberately puts on in the morning—it just isn't done, you know. The natural inference was that he had been inside the garment all night. Whether he had slept in it or walked around in it or just been in it, I don't know. But this I do know: at 9 a. m. Eastern Standard time, he was in it.

"Let me fix you a sausage," said Lady Heath, amiably holding out one of the things on a fork. A look of pain spread over Biddlecombe's face. "I loathe sausages," he said, "especially this morning." "Then have a cup of

(*Continued on next page*)

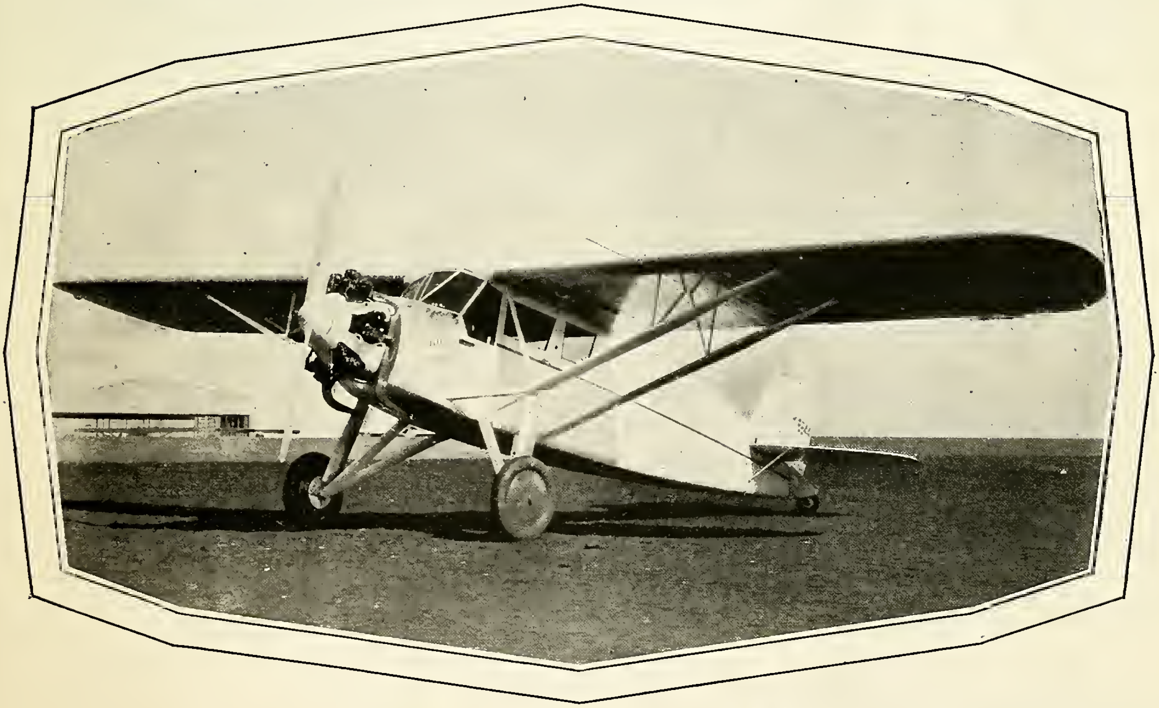
The New
Travel Air
four place cabin monoplane

In Accessibility and Visibility—in Beauty of Design and Finish, the New Travel Air 4-place Cabin Monoplane was the sensation of the All-American Aircraft Show.

In Rugged Construction — in Positive Control—in ease of Handling—in Inherent Stability, this new plane fully equals the Travel Air 6-place Cabin Monoplane, which is now the accepted standard of Aircraft Comparison. Behind it are the vast resources and world-wide prestige of the Travel Air Company.

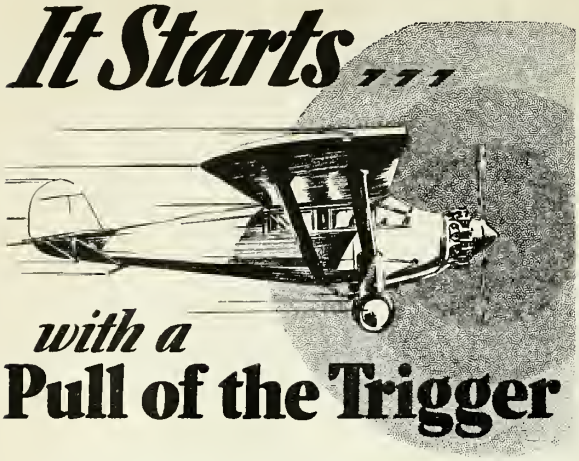
Dual "Dep" Control makes learning to fly this new plane as easy as learning to drive an automobile. Full specifications on request.

THE STANDARD OF AIRCRAFT COMPARISON



TRAVEL AIR
COMPANY
WICHITA, KANSAS

It Starts...

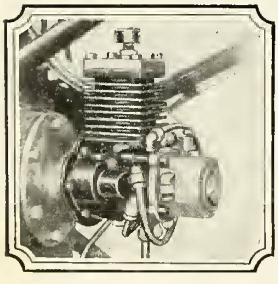


with a Pull of the Trigger

WHETHER on the ground or in the air—you can always depend on a Heywood for the performance expected of a reliable aircraft starter.

The quality of material used and the precision standards employed in manufacturing meet every requirement for simplicity and lightness of construction. Originally designed for a specific purpose and constantly improved and refined—today, the Heywood Starter combines every advanced feature for your safety and comfort. Truly, a Heywood Aircraft Starter brings to you the carefree convenience of your own automobile.

The most exacting pilots and manufacturers are enthusiastic in their unqualified endorsement of this dependable unit.



The Heywood Starter trigger, located on dash, releases compressed air that rotates engine at required speed and injects a carbureted mixture into the cylinders in firing order. It is an unfailing starting device under all weather conditions.

Complete details and installation data sent on request. Give make and model of engine.

THE HEYWOOD STARTER CORP.
6547 St. Paul Ave. Detroit, Mich., U.S.A.

SAFE DEPENDABLE POSITIVE CONVENIENT

HEYWOOD self STARTER

(Continued from preceding page)

coffee," she said. "I loathe coffee," said the suffering man. "I want some tea and toast a kippaws—I love kippaws."

The oddly caparisoned kipper consumer threw himself in a chair and took a sip of water. This was in the Book-Cadillac, whose emblem, as you may know, is a shield with six little ducks on it—you may see the same device on the radiator of a Cadillac car. And Biddlecombe noticed these ducks engraved on the glass. "Do you know," he said, "when we first arrived here these ducks couldn't swim. But in one week of this Air Show they've not only learned, but have challenged Gertrude Ederle to swim the channel against them."

At that moment the kippers arrived and Biddlecombe ate his way to fame in a Tuxedo. He was going to a dance that night, he said, and was puzzled to know whether he should wear his golf togs or a bathing suit. I solved the difficulty by suggesting that he wear his flying suit over his pajamas, and carry his golf clubs. Then he would be ready for anything.

RADIOPHONE IN USE

(Continued from page 49)

Transcontinental mail-express and passenger planes flown by the Boeing system between Chicago and Oakland-San Francisco not only have the newly announced Boeing radiophone service, giving voice communication between plane and ground, but will take advantage of directive radio beacon system and weather report service maintained on the air network by the Department of Commerce.

A radio beam is broadcast by transmitters known as equi-signal beacons. Transmitters employ cross loops, radiating a characteristic "dot and dash" signal. When dots and dashes blend into a continuous series of "dashes" the pilot knows he is on the course fixed by the beacon. If he hears "dot-dash," he knows he is to the left of his true course, and when he hears "dash-dot," he learns he is to the right of his course.

In fog or bad weather, Boeing pilots, with the directive radio system, can determine the proximity of an airport by the narrowing path of a radio beam. Intensity of signals is another sign of approach to the terminal. A marker, which sends a vigorous signal heard through the course signals, also informs him that he is above the field.

The Department of Commerce plans to have these directional beacons placed every 200 miles. After leaving an airport the pilot follows the course indicated by the directional apparatus of that station until half way to the next, when the beacon on the field of his destination becomes effective. He follows that beam, as shown on his receiving set, to a scheduled stop. The Government radio beacon and weather reporting service, as well as the radiophone, can be received with the equipment installed on the Boeing planes.

The importance of the Boeing progress in the field of radiophone is already apparent with the operations department of the Boeing System, and undoubtedly it is the first step in the comprehensive network in this form of communication. With the prospect of planes in and out of the large terminals every minute in the near future, radiophone communication between ground and plane is almost imperative. The perfection of an adequate phone system by the Boeing company, accomplished in conjunction with research of the Bureau of Standards, the Department of Commerce, and equipment companies works a radical change in the picture of air transportation. Airplane traffic controlled by radiophone will be complicated but highly dependable.

ROY F. MORRIS, President and Manager

ROY MORRIS WILL TEACH YOU BEST

CHANGING types in planes, new technique, ultra-modern instruments and equipment make it imperative for flyers to keep abreast of the times. Even old experienced war flyers could not step into today's ships and fly. That's why it is important that you get your first training where the newest methods are taught and newest ships and equipment are provided.

Here you learn to fly in new ships—monoplanes and biplanes—including American Eagles, Eaglerocks, Ryan Monoplanes and our own make, the "Dove." You help make new planes, rebuild old ones, you'll see more engines, parts and supplies than you ever knew existed.

Your training will be entirely practical, you work with tools and ships under some of the finest experienced instructors in the country today. I've had 10 years of flying myself, but I take off my hat to the men I've assembled to take charge of your training—they're skilled flyers—and even more important—trained instructors. Here's the place to get the best start for success.

—At Lowest Cost—

We've built up a wonderful school here because we give every student his full money's worth. We've made these courses just as low as is consistent with the best training—that's why every Morris graduate is a booster.

Courses Fit You for High Pay Jobs

You put yourself in the way of big pay in any course you take here. The world needs men equipped to take jobs as aviation mechanics, riggers, flyers, aerial photo pilots, aerial advertisers, crop dusters, commercial and transport pilots—all at good pay. Your training here assures success.

Complete Ground and Mechanical Course, $175

Big value course teaches airplane building, assembly and rebuilding of all make airplane motors. Makes you a first class mechanic and airplane builder—fit for a high pay job—at $50 to $150 a week. Night classes from 6:30 to 9:30, which allows you to work daytime at regular position.

Student Flying Course

Ten hours' flying time, including one SOLO FLIGHT and complete ground and mechanic course. When this course is completed you are permitted to take the plane and fly by yourself. Gives you all the essentials of flying for only $275.

Combination Ground Course and 12-Hour Student Flying Course, $375

This complete course gives you full and complete ground training and with many students several hours of solo flying.

60-65 hour Commercial Pilot Course—$850

This is the course for those who would make commercial flying their vocation. It gives you 50 to 55 hours solo flying, 10 hours Dual Instruction and complete ground course. If you intend to enter aviation in the truly BIG PAY class, this is your opportunity to learn all there is to know about it. Includes navigation, meteorology and air traffic regulations. All latest flying knowledge.

200-220 hour Transport Pilot Course—$2600

The transport pilot is the highest paid. He must have at least 200 solo hours. His salary usually runs from $350 to $650 a month. This is a wonderful course, including finest personal instruction, navigation, meteorology, air traffic regulations and all latest flying knowledge. You'll pay for this training inside of a few months at the big wages it will qualify you for.

"One of our Student Flying Classes." Aviation is opening big opportunities for both men and women. We have plenty of ships and you can start your training the day you arrive.

Special 30-Day Offer

To those enrolling in our Transport Course, we will guarantee a Full Fledged Pilot's or Transport Position at Good Wages, upon completion of the course. We make this offer for 30 days only. Wire today at our expense to insure guaranteed position.

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1. We have an airplane manufacturing company in conjunction with our school where the student has a chance to learn about building and construction of airplanes and motors.
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6. Your cost of living, while taking training will be only about $7.50 to $10.00 per week.
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8. We are one of the largest and fastest growing schools in the middle west and have a most modern shop and factory.
9. You receive training on several different makes of planes, such as Ryan and Travel Air Monoplanes, American Eagles, Eaglerocks and our own make, the "DOVE," thus qualifying you for a better position, as you have a thorough knowledge of different makes and types of airplanes.

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AIR—HOT AND OTHERWISE

(*Continued from page* 45)

somebody's knee. The trouble seems to be that there is too much fear in far too many hearts that each owner of the heart will not get his. And Mayor Lodge is a relative of Colonel Lindbergh. My, my! What a difference there sometimes is between the different members of a family!

It is depressing to find a city like Detroit, full of air-minded and progressive people, some of them apparently with power but governmentally controlled by politicians so lacking in right spirit that while the money already has been appropriated for the purpose they hesitate to furnish a great public utility as they ponder as to which land-owner will give the biggest split.

Some day manufacturers will refuse to kid themselves, or refuse to let bright young men hankering after goozy salaries kid them. Mutual admiration society methods don't mean a thing in a serious new industry. The issuance of false publicity stories will help no one. We at Aero Digest booth heard so many conflicting tales that, with my curiosity awake and with an associate to help me, I made the tour of ten exhibits. A second tour within two hours found the attendants as enthusiastic and as vocal. But when we started to check up the tales told during the two calls . . . well, they didn't check at all. Better memories are needed in the promotion end of the air game. Such methods are mere nonsense. There's no money in them. There's no dignity in them.

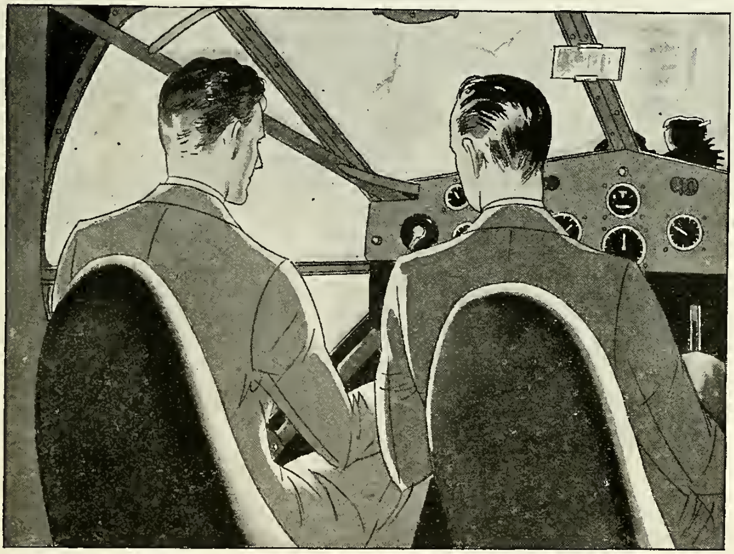
SOME of the nation's great minds which happen to be pondering aviation in different sections of this widespread nation, but which are swinging ponderously about in circles, trying to make definite state and city programs, might profitably consider recent developments in New York State and City. These include a really constructive list of actually valuable plans. A year or so ago Senator J. Griswold Webb, of Dutchess County, a man of intellect and vision, became convinced that aviation had arrived. Being possessed of that most valuable of all qualities, an accurate imagination, he forthwith bought himself a plane. After two months in the air he took out his convictions, carefully examined them and found they had been fully confirmed. So the beginning of the following session of the legislature found Senator Webb sitting at his desk, his sleeves rolled up, his forehead puckered in a thoughtful frown as he worked out legislation which would make the State as near as possible to fool proof with regard to the new art; how to practice it—and how not. Senator Webb is not the type of man who knows it all until he actually does, and then a large part of what he knows is that there remains much more to learn. Seeking useful hints he called in the world's most useful aviation-hinter. Bill MacCracken set him at the job of hinting. These two sat in some quiet spot and b-u-z-z-e-d. A few weeks later the Capitol at Albany thrilled to the thought waves of a special legislative committee upon aviation.

This year, due to Senator Webb's admirable activities, the Special Legislative Committee has become a State Commission with regulatory powers. Unlike most State Commissions, it started at real work immediately after birth. Even up to date it has accomplished much. Governor Roosevelt, in appointing this Commission, consulted with the man who suggested it, and, as a result, only really air-minded men are members. Major John Dwight Sullivan, commander of American Legion Aviators' Post No. 743, a war veteran, and Peter F. Brady, president of

(*Continued on next page*)

STABILITY *versus* BALANCE

The inherent stability of the Ryan is like the "comeback" of the boxing dummy



Heretofore, aircraft balance has been as precarious as a juggler's trick

TAKE the stick and convince yourself regarding the new Ryan Brougham for Six. You will agree that its ease of handling, stability and sureness of control widen the margin of superiority which the world concedes to Ryan.

You will grasp the difference between merely a delicately balanced ship that will fly "hands off" only after a close adjustment of the stabilizer, and the new Ryan which comes back smoothly, automatically, and with certainty after being deliberately forced out of normal flight.

The Ryan differential aileron control is so quick and smooth that it is best left alone, in fact, the ship will bank automatically if the rudder is used and can be easily steered by the ailerons. Directional control has been perfected to a degree that is a delight to mail pilots and other cross-country flyers.

To meet the new Ryan production schedule, now in full swing at the St. Louis plant, contract has been let for more than a million and a quarter dollars' worth of the new Wright Whirlwind 300 horsepower J-6 engines.

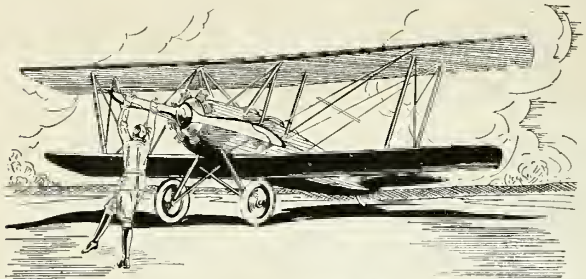
Early deliveries of the new Brougham are now obtainable through Ryan distributors at principal airports throughout this country and abroad. Write for new illustrated catalog.

THE MAHONEY-RYAN AIRCRAFT CORP'N
LAMBERT-ST. LOUIS AIRPORT
ANGLUM, ST. LOUIS COUNTY, MISSOURI

P. DeC. Ball, President and Chairman of Ryan Board, Col. Charles A. Lindbergh and J. J. "Red" Harrigan, photographed after Col. Lindbergh's recent test flight in the new Ryan

The New RYAN BROUGHAM for Six

ISTER SHIP OF THE "SPIRIT OF ST. LOUIS"



"Contact"—*is the start of Paragon dependability!*

1350—1600—1950 R.P.M. on the ground — thrust—quick take-off—climbability—no sacrifice of speed —there's where you notice the difference with a Paragon Tulip!

Blade design gives that pitch reduction for full revs on the ground —yet, full pitch flying level. Plenty of thrust for take-off and climb—top speed in level flight without over-speeding the motor—the extra speed is all in the ship.

Perfect balance — generous sheathing of special alloys—super-resistant leading edges—superb in appearance—absolutely guaranteed —the new Paragon Tulip!

There's a little pamphlet just off the press to give you added details —prices and discounts. Ask for one today.

Just a word about the MONOID

For the man who wants the very finest—strength unbelievable — surprising durability — patented sheathing that cannot crack—performance unexcelled—we have developed the Paragon Monoid. Booklet on request.

Paragon Engineers, Inc.
242 Grindall St.,
BALTIMORE, MD.

Paragon Propellers

2140-R

(*Continued from preceding page*)

the American Federation of Labor Bank, who probably has done more flying than any other bank president, are two of the members. Brady likes the whole idea and when Peter Brady likes a thing he works at it. Governor Roosevelt has set a worthy precedent. Newspapers in all State capitals please copy.

A good example may do wonders. New York's mayor, Jimmy Walker, the mayor with the well-pressed trousers and engaging grin, a close friend of Pete's, was instantaneously sold on the idea, and, as a result, New York City, also, now has a Committee which will advise with the mayor (now and then, when the latter happens to be visiting the city from Florida, or Cuba, or some other of his playgrounds) concerning New York's aviation requirements, gradually working out a program for meeting New York's aviation needs, present and future, consulting constantly with that same Peter Brady. In the selection of his personnel the mayor saw the wisdom of tying up with Federal authorities and so named, among others, Senator Wagner and Congressman Loring F. Black.

Organizations of this sort, as intelligently composed, should be worked out in every state and city in the country. It would help aviation grow and eliminate many problems which already have arisen concerning the relationship of state and local legislation to matters aeronautical before they become serious. One advantage of all this linking up and sewing interests together will be that New York's state and local propositions not only thus may be prevented from conflict with Federal laws, but may be made complementary to them. This procedure is the only one in sight which could prevent political nobodies from endeavoring to stow away in some dim recess of our national fuselage, sheer dead weight or worse. Aviation is for birds, not sharks. These committees and commissions will help keep out wrong animal breeds.

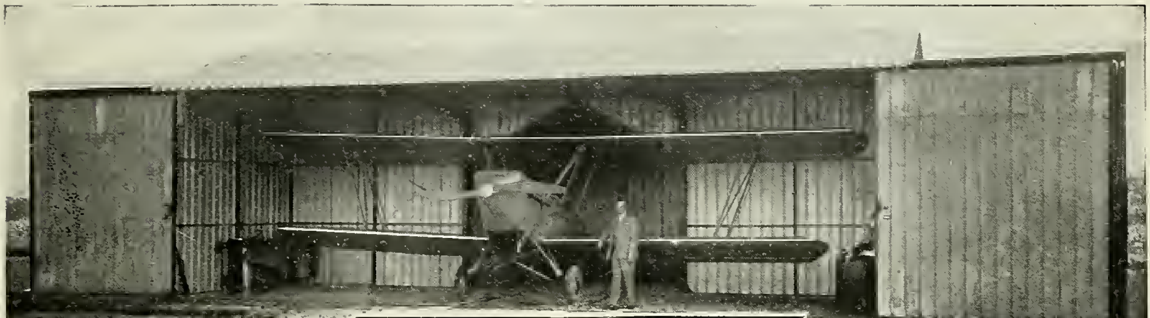
SPEAKING of legislation it becomes evident, now, that the Federal Five Year Program is inadequate. When the law was enacted it seemed ample. Now, owing to the developments of the past year or two, the program, when set beside the importance of air development in the national defense, proves utterly inadequate in almost every detail. What we actually need is five times the Five Year Program not in five years, but now—at once. If we have another war (and we shall have it) the country having the biggest and best equipped Air Force will win it. After it has come it will be over before we could possibly build planes and train men to fly them, and it will have been won as no other war in history has been won. There will be no time for getting ready, for there will be no warning till the bombs begin to drop. If we are not ready long before the start comes, there will be no use of even making plans. Capitulation will be all that will be left to us—a new experience for Uncle Samuel and his bright boys. The old theory that we are safe because we have an ocean on each side became a joke when Lindbergh went to Paris.

Hours, not days, will pass between the first buzz of the hostile airplanes off our coasts and the massacre of civilian populations in our inland centers by the simple means of poison gas. All the horrors of the World War will seem playboy antics to the horrors that will mark the next one—of which we shall be the special targets if we don't watch out. It is not inconceivable that we might be compelled to sue for peace within a week. Our industrial cities, our

(*Continued on next page*)

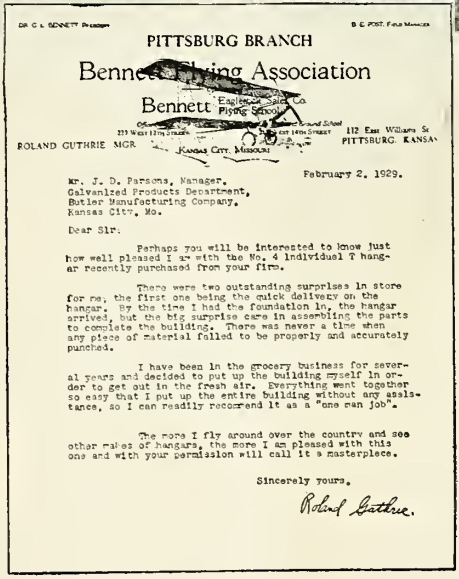
"Erected It Myself"

Says Roland Guthrie



Ready-made means just that when applied to Butler Steel Buildings. Every unit is formed to template and matched punching facilitates bolting accurately in position in the assembly.

Roland Guthrie erected this individual "T" Hanger single handed. "Everything went together so easily that I put up the entire building without any assistance, so I can readily recommend it as a 'one man job'," says his letter. No mechanic is needed. Mr. Guthrie formerly was in the grocery business. Now he is flying and says "The more I fly around over the country and see other hangars, the more I am pleased with this one".



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ROLAND GUTHRIE MGR

112 East Williams St.
PITTSBURG, KANSAS

February 2, 1929.

Mr. J. D. Parsons, Manager,
Galvanized Products Department,
Butler Manufacturing Company,
Kansas City, Mo.

Dear Sir:

Perhaps you will be interested to know just how well pleased I am with the No. 4 Individual T hangar recently purchased from your firm.

There were two outstanding surprises in store for me; the first one being the quick delivery on the hangar. By the time I had the foundation in, the hangar arrived, but the big surprise came in assembling the parts to complete the building. There was never a time when any piece of material failed to be properly and accurately punched.

I have been in the grocery business for several years and decided to put up the building myself in order to get out in the fresh air. Everything went together so easy that I put up the entire building without any assistance, so I can readily recommend it as a "one man job".

The more I fly around over the country and see other makes of hangars, the more I am pleased with this one and with your permission will call it a masterpiece.

Sincerely yours,

Roland Guthrie.

Though quickly and easily erected, or taken down and re-erected—permanency is one of the outstanding characteristics of Butler Ready-Made Hangars. Prime quality steel is ingeniously formed to secure the greatest strength per pound.

Butler Individual Hangars are made in sizes suitable for all ships. Butler Commercial Hangars range in size from those suitable for outpost air stations of transport lines to the enormous airport types with clear spans of 80 feet and more.

Butler engineering service will supply you with the information you need—and prices, if you mention the size building needed.

BUTLER

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In all Butler Ready-Made buildings, the galvanized steel wall and roof sections are stiffened with deeply drawn corrugations on 8-inch centers giving a neat paneled effect.

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A Tricky Landing!

THE stress and strain of flying and landing calls for solid construction without increased weight. Screws are small but important items in this work.

American Screws are established favorites in building and servicing modern aircraft. Made of low-carbon steel, they stand up against severe strain. Their sharp, gimlet points allow accurate insertion, and deep, true-running threads provide the closest grip possible. You can do any job better with American Screws.

"Wood Screws," the story of the development and manufacture of good screws, will be forwarded to you on request.

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PROVIDENCE, R.I., U.S.A.
WESTERN DEPOT, 225 WEST RANDOLPH ST., CHICAGO, ILL.

"Put It Together With Screws"

(*Continued from preceding page*)

railroads, our mobilization points would be washed out in a jiffy. A sponge wiped across the map of the United States will erase our happiness, our great prosperity, our independence if we sleep on.

Let's not sleep on! Let some Senator or Congressman with vision see this picture in advance and lead the country to real preparation for the terrible emergency which can be indefinitely deferred only by such preparation. Forget the League of Nations, forget the goo talk of the pacifists, remember—human history! Get ready!

ALTITUDE FLIGHTS

(*Continued from page 42*)

altitude determinations made by three different methods. (1) The F. A. I. standard atmosphere method, which gives an arbitrary altitude-pressure relation that is used only for purposes of international comparison. (2) The photographic method, which, from the knowledge of the focal length of the camera and measurements of the object on the ground and the image obtained on the plate, gives by computation the tape-line altitude above the ground. (3) The barometric formula method, which takes into consideration the pressure and temperature of the air column traversed during the flight. The latter method is outlined in N. A. C. A. Technical Report No. 246, pages 6 to 8. The results of the various altitude determinations for the flight of October 10th are given in the following table:

F. A. I. Standard Atmosphere Method	37,854 feet
Camera Method	39,250 feet
Barometric Formula Method	39,606 feet

The above values are all above sea level. The elevation of Wright Field is 800 feet. The elevation of the ground photographed at the ceiling of the flight near Rushville, Indiana, is 970 feet. A comparison of the above values indicates that with reference to the photographic method, the barometric formula method gives a value which is 0.9 per cent too high, and that the F. A. I. standard atmosphere method gives a value which is 3.6 per cent too low. Since service altimeters are calibrated in accordance with the U. S. standard atmosphere given in N. A. C. A. Report No. 246, and the official records are determined from the barograph calibrated in accordance with the F. A. I. formula of 1920, it is easy to see why there is usually such a discrepancy between the cockpit altimeter and barograph readings obtained at the ceiling of high altitude flights.

On November 7th, at Dessau, Germany, Franz Kneer, a German pilot, made a successful flight in a Junkers W-34 seaplane, powered with a Bristol Jupiter VII engine of 420 horsepower. The ship carried a pay load of 1,000 kilograms. The minimum pressure recorded at the ceiling of this flight was 329 millimeters of mercury, which is equivalent to 6,389 meters, or 20,961 feet. This flight established a new official world's record for a seaplane carrying a pay load of 1,000 kilograms. This record exceeded by 1,368 feet that made by Lieut. Arthur Gavin in a PN-12 seaplane on June 27th at Philadelphia.

On December 2nd, at Curtiss Field, Long Island, New York, Lady Mary Heath, the noted British aviatrix who is visiting this country, made an altitude flight in a D. H. Moth landplane, powered with a Gipsy motor of 80 horsepower. Lady Heath relates that near the peak of her climb a very strong wind was blowing, somewhere in the neighborhood of 80 miles per hour. Into this gale she headed her ship making every effort to gain a little more

(*Continued on next page*)

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AT THE AIR CAPITAL

WICHITA, KANSAS, is recognized as the Air Capital of America because it has more airplane factories than any other city. One-fourth of all the commercial planes flying in America today were made in Wichita. In 1928 six factories were producing airplanes here and by April 1st there were nine different airplane manufacturing concerns in the game and five others organizing. Today this remarkable advance continues and Wichita is the Hollywood of aviation. Leaders in the industry are rapidly centering their interests here.

THE BRALEY SCHOOL OF FLYING, INC., of Wichita, is one of the world's best aviation schools. With a group of large brick and steel buildings and complete ground and flying equipment it is the ideal aviation college.

AT THE HOME OF ONE OF AMERICA'S *FASTEST CLIMBING* AIRPLANES

When the "Beezle Bug", sensational new training plane designed and produced in the shops of THE BRALEY SCHOOL OF FLYING, INC., hopped off in 4 seconds and climbed 5,000 feet in three minutes, it was simply fulfilling the advance calculations of experts in the Braley staff.

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AT ONE OF THE FINEST AIRPORTS DEVOTED EXCLUSIVELY TO A SCHOOL

The Braley School field, 313 acres, a half mile from Wichita's new municipal field, is frequently chosen by big incoming ships for its excellence. It is in the midst of aerial activity, with five of Wichita's leading airplane factories in close proximity. At Braley School you are in CONTACT with the very heart of aviation — surrounded with OPPORTUNITIES.

ENROLL TODAY at Braley School, where you can get training of utmost efficiency. Many Braley students EARN in Braley's own factory as they LEARN. Employers everywhere recognize the value of the BRALEY O. K. Eight courses adapted to varied objectives at prices ranging from $75 up. Write for details.

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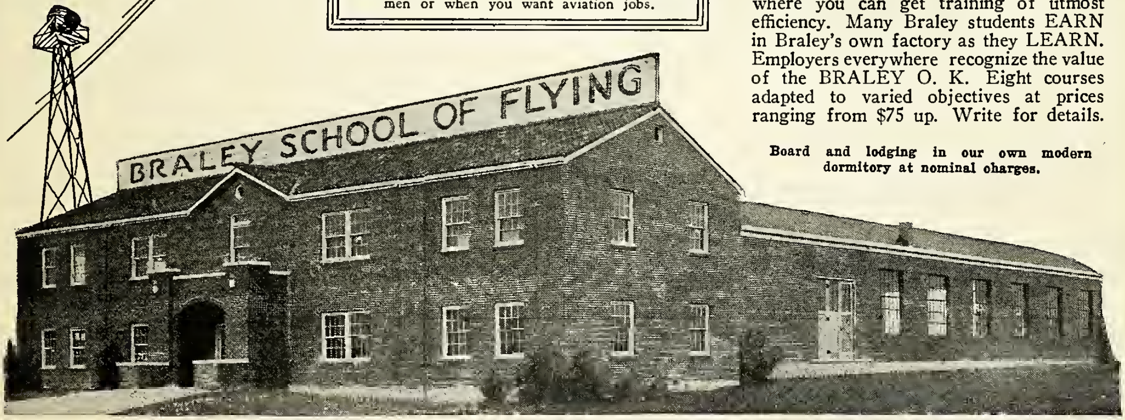
Get in touch with our free employment bureau whenever you want qualified pilots or ground men or when you want aviation jobs.



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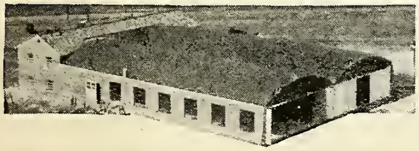

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STUDENT PILOTS and young men about to enter the game can cut down the number of hours usually necessary before soloing by a study of the greatest flying instruction book of the year, "Modern Flight".

MASTER PILOT CLEVENGER out of the wealth of his 10 years' flying experience, explains in simple, interesting language, every movement of the controls for take-offs, landings, straight flight and aerobatics.

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Rush copy of Clevenger's complete flying course.
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ALEXANDER AIRCRAFT CO.
Manufacturers of the Eaglerock
Room 403, Alexander Industries, Inc.,
Colorado Springs, Colo.

(*Continued from preceding page*)

altitude. On glancing down below she had the novel experience of progressing backwards (with respect to the earth), the world receding instead of approaching. At the ceiling of the flight, which had lasted somewhat more than an hour and a quarter, she found herself over Port Washington. At this point she descended into warmer air and headed for Curtiss Field at which place the flight ended. The recording barograph, after being checked at the Bureau of Standards, gave a minimum pressure of 399 millimeters of mercury, which is equivalent to 5,008 meters, or to 16,430 feet. This flight which lasted an hour and a half was an unofficial American record for women, exceeding that made by Miss Elinor Smith on August 21st by 4,767 feet.

On December 7th, at the Municipal Airport of Oakland, California, Louise McPhetridge made a flight in a Travel Air landplane equipped with a Hispano-Suiza motor of 180 horsepower. Oxygen equipment and a parachute were provided. The climb to the ceiling of the ship was made in approximately one hour. Just before the ceiling of the flight was reached, the clockwork of the barograph stopped running for a short period because of the low temperatures. Soon after the return to earth, however, the clockwork started again. In the absence of necessary temperature data at the ceiling of the flight, the barograph's ceiling temperature was assumed to be —10° Centigrade and tests were made accordingly. The minimum pressure recorded at the ceiling was 339 millimeters of mercury, which is equivalent to 6,178 meters, or to 20,270 feet. The flight, which lasted 1 hour and 35 minutes, established an unofficial altitude record for women, exceeding that made by Lady Heath on December 2nd by 3,840 feet. This record, unbeaten at the close of the year 1928, has not yet been exceeded.

On December 11th, at Wright Field, Dayton, Ohio, Lieut. Harry Johnson and Capt. A. W. Stevens, U. S. A., made a new altitude attempt with a camera in the X-CO5A landplane, powered as before with a supercharged Liberty motor of 400 horsepower. In this trial, added precautions were taken with the barographs in order to ensure continuous records of the flight. At Wright Field, the clockworks of both instruments used were cleansed free from oil and then graphited as described above. As an added precaution one instrument was prepared with an extra mainspring in an effort to double the driving force exerted on the recording drum. The result was that both clockworks ran satisfactorily from the start to the finish of the flight, in spite of the fact that the plane was kept at its ceiling, approximately 36,900 feet, for more than an hour. When at this altitude, the temperature of the free air as recorded by the bimetal strip strut thermometer was —57° C., the temperature of the camera compartment in the rear cockpit was —52° C., and the temperature of the barograph was —47° C., all to an accuracy of 3° C. The flight at the ceiling was so prolonged on this occasion that the liquid in the spirit levels which were mounted on the camera froze solid. The stay at the ceiling was purposely prolonged in order to study the low temperature effects on the sensitivity of the emulsion of the photographic film. Upon development some time later, it was noted that there had been a slight loss in sensitivity. At the end of the flight, which lasted 2 hours and 18 minutes, the two barographs and bimetal minimum-temperature recorders were sent to the Bureau of Standards for checking. The minimum temperatures reached in the flight were determined by placing the bimetal elements in a bath of chloroform and

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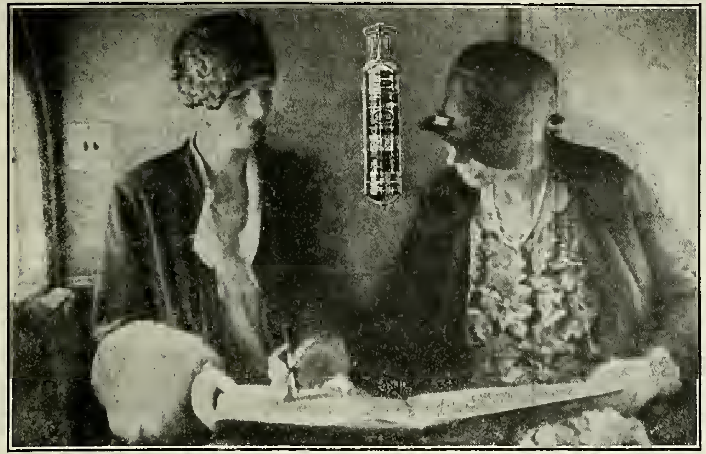
Photo by courtesy of
Hearst's International-Cosmopolitan for December, 1928



Twenty-five hundred feet in the air, Amelia Earhart and Mrs. George Palmer Putnam sign the guest-book of James H. Rand's airplane.

Follow the Leaders, Install Pyrene Fire Equipment

THIS news photo of Miss Amelia Earhart, the famous trans-Atlantic flyer, from a recent issue of Cosmopolitan Magazine, clearly shows that the plane is Pyrene-protected.

Pyrene saved Courtney, the English flyer. In mid-Atlantic his back engine caught fire while flying at 1500 feet. Pyrene immediately extinguished the flames. Famous flyers favor Pyrene.

Protect your planes, your hangars and your plants with Pyrene Fire Equipment. It is best known and most dependable. There is a type of extinguisher for every hazard in every branch of aviation.

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Branches: Atlanta — Chicago — Kansas City
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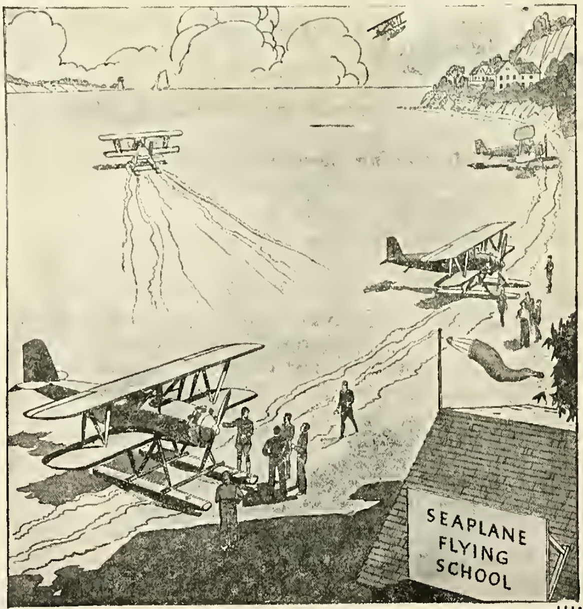
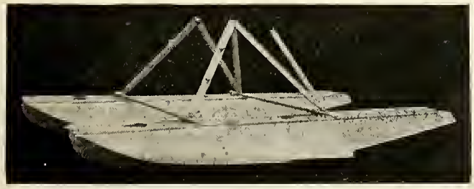
Students are readily attracted to a Seaplane Flying School. Large areas for instruction and solo practice, the remoteness of buildings and other obstacles, the realization that a landing field is always beneath, the absence of distracting crowds—these bring quick confidence to the student-pilot and lighten the task of the instructor. Moreover the reduced hazard of collision and the greater safety in the remote event of a crash are clearly recognized. The majority of land training planes are now available equipped with standardized Edo Float installations for water flying. Or your present planes may be Edo-equipped in a few hours. For a good place to operate, any river, open lake or bay provides a perfect "landing field"—free from upkeep expense or rent. May Edo send further particulars? Address Edo Aircraft Corporation, 610 Second Street, College Point, Long Island, N. Y.





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THE WORLD'S GREATEST
AIRMEN ARE PROTECTED BY
LUXOR GOGGLES

Practically without exception, pilots who have spanned the oceans, explored the polar wastes and broken airplane speed, endurance and altitude records have staked their lives on Luxor Goggles.

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There can be but one answer! A goggle of unquestioned dependability—meeting every aviation requirement and emergency—affording perfect vision and eye protection at all times—the finest goggle built!

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(*Continued from preceding page*)

carbon tetrachloride together with a standard thermometer, and then gradually lowering the temperature of the bath by introducing small pieces of carbon dioxide ice (Dry Ice). When the pointer came to rest at the bottom of its arclike trace made on a smoked plate, the standard thermometer was read. In this way the minimum free air temperature and the camera compartment temperature given above were determined. The barograph, when calibrated against the standard barometer, gave a minimum pressure of 159 millimeters of mercury, which is equivalent to 11,248 meters, or to 36,903 feet. This altitude was 951 feet short of that made by the same ship on October 10th. Several similar flights have been made since that time, but the indications now are that this unofficial two-man altitude record will not be soon surpassed.

For ready reference the altitude flights made during 1928 are given in groups in the following table:

Date of flight	Pilot	Payload (kilos)	Barometric press. at ceiling (mms. mercury)	F. A. I. Altitude at ceiling (meters)	(feet)
Seaplanes					
May 28	Lt. Soucek	1000	406	4881	16,014
June 15	Lt. Gavin	2000	471	3776	12,388
June 16	Lt. Gavin	1000	380	5362	17,592
June 26	Lt. Gavin	2000	416	4702	15,426
June 27	Lt. Gavin*	1000	349	5972	19,593
Nov. 7	Franz Kneer**	1000	329	6389	20,961
Landplanes *(military)*					
June 16	Lt. Bleakley		162	11,128	36,509
July 31	Lt. Champion		261	7,985	26,197
Oct. 10	Capts. Streett & Stevens		152	11,538	37,854
Dec. 11	Lt. Johnson, Cpt. Stevens		159	11,248	36,903
Landplanes *(commercial)*					
July 27	Cpt.& Mrs. DeHavilland**		345	6,054	19,862
Aug. 21	Elinor Smith		485	3,555	11,663
Dec. 2	Lady Heath		399	5,008	16,430
Dec.. 7	Louise McPhetridge		339	6,178	20,270

*Then an official world record. **Now an official world record.

(*Publication Approved by the Director of the Bureau of Standards of the U. S. Department of Commerce.*)

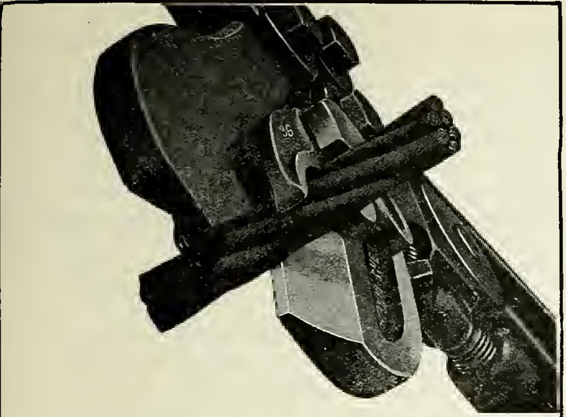
RECREATION AT FLYING SCHOOLS

(*Continued from page* 55)

judgment to the highest degree, and because he must keep the general tone of his physical life high, he must respect the benefits of supervised and carefully planned recreation and sport.

The time to start this training is when he enters the flying school.

We cannot disregard girls in any discussion of the future flying school. They will be present in increasing numbers. Many of the same sports such as archery, tennis, shuttlecock, fencing and quoits will interest them, and develop their senses of balance, judgment and deliberation.



PORTER'S
Shear Cutter

Built upon the Porter lever and toggle joint principle but with an entirely new type of jaws. A portable hand-operated tool that will cut flat bar stock up to 1½" x 9/32" or stranded wire rope up to ⅝" in any position anywhere.

Jaws cut like shears, leaving no broken edges or no uncut strands. Will not unduly twist or distort material. Makes clean cut at one operation.

In capacity, power and portability, no other tool can be compared with a Porter Shear Cutter because no tool heretofore devised comes within its field of usefulness.

One of a line of Porter's Portable Time-saving hand-operated cutting tools.

Take the tool to the work, not the work to the tool.

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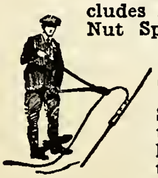

Any flat material, within capacity limits, may be cut with amazing ease.

Bars, straps, guy ropes, hoist cables, airplane struts, cables and rods, control cables, steel strips, metal straps, etc.

This tool is made in three sizes—14 inches long to cut 5/16" wire rope or 7/8" x 5/32" flat bars; 24 inches long to cut 7/16" wire rope or flat stock 1¼" x 7/32"; 36 inches long to cut ⅝" wire rope or 1½" x 9/32" flat stock.

These, and all other Porter tools, are sold by leading jobbers and supply houses.

The Porter line includes Bolt Clippers, Nut Splitters, Shear Cutters, Wire Cutters, Chain Cutters, etc.

Send for illustrated booklet describing tools and their uses.

CLEAR,

unobstructed, comfortable vision . . . which means increased safety

THE WILLSON PILOT GOGGLE

In the Willson Pilot Goggle, the lenses are large enough to permit clear vision through the entire field of normal eye rotation . . . horizontal vision of 135°. They are meniscus-ground with extreme optical precision, which means that they are perfectly neutral in every direction. So important does the U. S. Navy regard these points that they have been written into Navy specifications. The accuracy of the lenses in the Willson Pilot Goggle exceeds even these specifications.

You can wear them all day without discomfort. The sponge rubber vacuum mask fits every contour of the face, and because it is large in area, it fits lightly as well as firmly. The venturi-tube ventilating system provides total freedom from fogging, under flying conditions, and creates a partial vacuum which prevents the goggle's blowing off . . . even with wind pressure from the side.

The Willson Pilot Goggle is designed and constructed to last. Its workmanship throughout is comparable only with that of a precision laboratory instrument. Clear vision, comfort, durability, safety . . . this goggle offers the utmost of each. Yet it is priced no higher than many commercial goggles which do not meet Navy specifications . . . $20.

There is also the Willson Observer, at $10, exceptionally satisfactory in the service for which it is designed. If your dealer cannot supply you with these goggles, write direct to us.

Airports and flying schools find Willson Goggles a popular and successful line. Write for detailed information.

Willson Products, Inc.
Aviation Division
239 Washington Street
READING, PENNSYLVANIA

RELIEF WORK BY AIRPLANE

(*Continued from page 46*)

points nearest these towns which could be reached by highways. Finding boats equipped with small motors the only means by which troops could rescue stranded persons from their refuges, virtually this entire unit of land troops turned its attention to the construction of these small craft. Twenty horsepower motors were carried from Montgomery by army planes, which dropped them by parachutes to the relief camps. In one instance, a large motor boat, dropped at Elba, Alabama by a low-flying plane, enabled relief workers to rescue about 2,500 persons marooned on a small hill entirely surrounded by twenty feet of water from the swollen Pea River.

Although accurate reports have been kept of the pilots engaged in this relief work, neither statistics nor pen nor tongue of the thousands of beneficiaries in flooded districts at Geneva, Elba, Brewton, Samson, Pollard, Flomaton and Keego can express adequately the gratitude of sufferers, many of whom owe their lives to the speed and dispatch with which their needs were supplied. In one instance a pilot, flying low over a housetop where on the first day of the flood he had dropped a supply of food to a group of people marooned there, saw outlined in white cloth on the roof these words, "God Bless You."

Upon the call for assistance from Governor Graves, Major Weaver turned the army air post into a receiving and dispatching station. With a chart beside his desk with the flights of planes, names of their pilots and observers marked on it, he remained almost constantly on duty until the floods had materially subsided and the pressure for relief had considerably lessened.

Supplies of all sorts, received through the American Red Cross and from civic, church and fraternal organizations throughout the state, were stored at Maxwell Field, until the transportation station resembled a gigantic war-time warehouse. As each plane returned to the field, its pilot and observer filed with the commandant a written report of their observations and any signals or radio messages they picked up while flying over the flooded zone. Copies of orders for any supplies that were wanted were dispatched immediately to the transportation depot, and within a few minutes, a second plane took off for the stricken area with these supplies packed in gunny-sacks and parachuted for delivery at the designated point. If the request came for something not immediately available, a call was promptly rushed through to the American Red Cross and the desired article was obtained and dispatched with all speed to the flying field.

Although evidences of destitution, destruction and dire need were appalling in and near the flooded towns, the most pathetic sights the airmen encountered were small groups of people isolated on rising ground or on the tops of small buildings, far from the main settlements. These groups were fed for days by airmen.

The relief system, perhaps the most efficacious ever devised for this work, included constant telephone communication between the commandant and the governor and a system of radio communication between observation planes and headquarters which enabled emergency orders to be relayed with the greatest possible speed. The War Department obtained exact knowledge of the situation through the telegraph and radio communication between Maxwell Field and the commanding general of the Fourth Corps Area in Atlanta.

A total of 185 trips was made in the first six days. On one day, March 17, 59 trips were made to the devastated

(*Continued on next page*)

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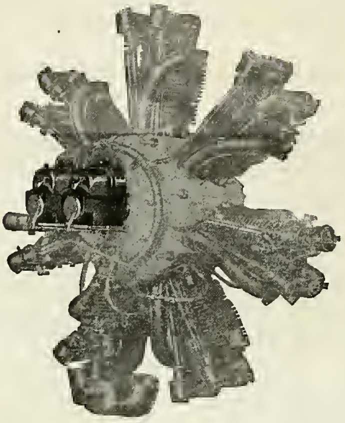
AIRCRAFT MAGNETOS
Are Selected Because of Their
Dependability—Simplicity—Accessibility



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Axelson Machine Co.

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NEW YORK CITY, Manhattan Ignition Corp., 206 W. 68th Street
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Scintilla Aircraft Magnetos can be obtained for engines of from one to eighteen cylinders

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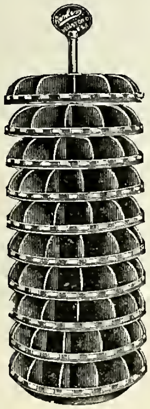
METHOD

For *every* flying field



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Enables you to "pilot" your service
PROFITABLY

To give wide-awake, snappy service your stock of parts and tools must be constantly and readily accessible. "Revolvo," the rotating display and storage cabinet does just this and more—it eliminates all confusion and waste of time, and presents a neat, business-like appearance.

RS-77, shown here, is a popular model of this line and may be used by itself or with overhead rack. It comes set up, ready to use, with 120 compartments. Although it requires a circular floor space of only 28" diameter, its capacity is equivalent to more than 70 feet of shelving display.

All "Revolvo" bins, cabinets, cases and stands are sturdily constructed of steel and iron, in sections. Placed in a corner, against the wall, or anywhere on the floor, it will utilize advantageously space that would otherwise be useless.

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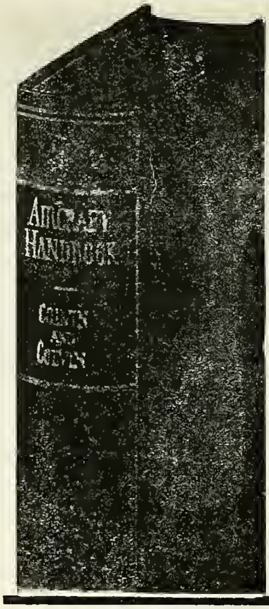

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A PRACTICAL book for the practical man—an eminently sound and authoritative discussion of all phases of the construction, operation, maintenance and repair of planes, motors, instruments, etc.

If it concerns aircraft motors, rigging, trouble-shooting, instruments, regulations, airports, etc., the fact you want is here.

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NEW THIRD EDITION

By FRED H. COLVIN and HENRY F. COLVIN

464 pages, 5 x 8, 152 illustrations, flexible Keratol

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THIS new third edition has been brought fully up to date. It gives complete information on the operation and maintenance of the standard aircraft engines of the day; information that is authoritative because prepared in cooperation with the manufacturers.

The newest development in aircraft instruments, including the earth inductor compass, are given prominence. Official Air Regulations of the Department of Commerce have been included and solid information on the construction of airports.

The book covers such topics as

—adjustments of ailerons;
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—shooting trouble on the Whitney-Wasp engine;
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Read this list of chapter headings

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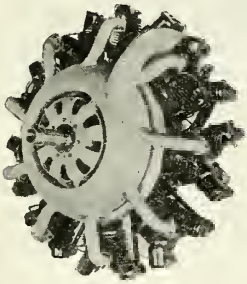
Southern Aeromotive Service
Inc.

Exclusive Wright service and parts distributor for Texas, Louisiana, Georgia and Alabama, with shops and service stations in all principal cities of these states.



WE can save operators of Wright Motors from two to three weeks on factory overhaul jobs. Our repair and maintenance service includes shop service in the principal cities of Texas, Louisiana, Alabama, and Georgia. This work is charged at factory scale rates and is guaranteed. All makes of aircraft and aircraft engines are serviced.

We are exclusive Texas distributors for Aircraft Instruments, Stromberg Carburetors, A. C. Spark Plugs, and A. C. Aircraft Instruments, Standard Steel Propellers, Goodyear Airplane Tires and Tubes, and Meyrowitz Goggles, in addition to other important accessories.

Write, wire or telephone for parts or service.

S·A·S
Southern Aeromotive Service Inc.

TOM HARDIN, Vice President and General Manager
General Offices: FORT WORTH, TEXAS

(*Continued from preceding page*)

regions by aircraft operating from Maxwell Field, for the purpose of establishing communications and ferrying food and medical supplies. The number on March 16 was 39 round trips.

While supplies were still going forward in considerable quantities, records at Maxwell Field showed that 1,600 blankets, 5,000 loaves of bread, 2,000 cans of bacon and cooked meats, 3,000 units of typhoid antitoxins, several tons of clothing, as well as miscellaneous supplies, had been transported by airplane to the flooded areas.

After the water had receded somewhat and overland communication had again been established for the alleviation of the distress, efforts of the Air Corps were relaxed but they are not to be abandoned until the situation is entirely in hand and rehabilitation complete.

According to Governor Graves, the dispatch with which Air Corps planes carried necessities to the flood victims has again clearly demonstrated the efficacy of the airplane and trained aerial observers in rendering aid to distressed victims of an unforeseen and sudden disaster.

THE MIAMI-PANAMA AIR ROUTE

(*Continued from page* 44)

northbound men who take the Miami pouch on through on their back trip to France Field again.

Air equipment has been redistributed so that now the limited amphibian type covers only the water hops whereas tri-motored landplanes take the dangerous run over the Honduran mountains and thereby reduce its hazards to a recognizeable minimum. At Belize, according to my latest advices, engineers are putting in a field to take the place of the old water and runway landing and after a final fruitless survey for a landing place on the Yucatan mainland, a field is being put in on Cozumel Island to obviate the lagoon landing.

Two months ago an approximate emergency location was maintained by advice of take-off being flashed from Miami to Havana—Havana to Belize—Belize to Tela—Tela to Mangua and Mangua to France Field, sketchy at best and throwing rescue operations to overland and boat parties or, in Nicaragua and Panama, to Marine Corps and Army planes. Today with north and southbound planes on a tri-weekly schedule, emergency operations can be carried on by the company itself—at a consequent reduction of salvage cost and publicity, which for flying operations of a commercial nature is as unwelcome as it would be for railroads if editors still front-paged every cracked rail or broken car window.

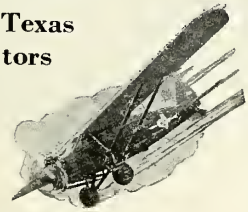
That is the story. From the map the route down and back presents something over a round four thousand five hundred miles only. From the actual terrain it presents the solution to engineering problems that have balked man ever since Balboa crossed the Isthmus of Panama. No through railroads traverse Central America from the Canal Zone to Mexico, and only four railroads cross it from the Atlantic to the Pacific. Twenty to thirty days of roundabout travel by coastal steamers has heretofore been the accepted time between points that lie no more than two and a half air hours from each other.

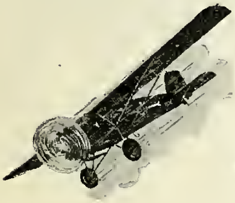
By careful and persistent work, backed by a daring that is merely workaday energy in flying, the Canal Zone, our most important military territory, has been brought as near to our continental limits as San Francisco is to New York, and seventy-two days has seen the accomplishment change swiftly from adventure to a firmly founded com-

(*Continued on next page*)

T·A·T Flying Service Inc.

Travel Air and
Curtiss Robin
Exclusive Texas
Distributors





SALES and service offices are maintained in the principal cities of Texas. We are equipped to show and demonstrate, on short notice, many Curtiss Robin and Travel Air Models.

Our experience in the daily use of Travel Air and Curtiss Robin planes for many purposes enables us to give prospective purchasers valuable advice when choosing a model for a particular use.

Quick service and delivery assured. Write, wire, or telephone for demonstration.

T-A-T Flying Service operates an Aerial Passenger service to twenty four Texas cities . . . daily schedules.

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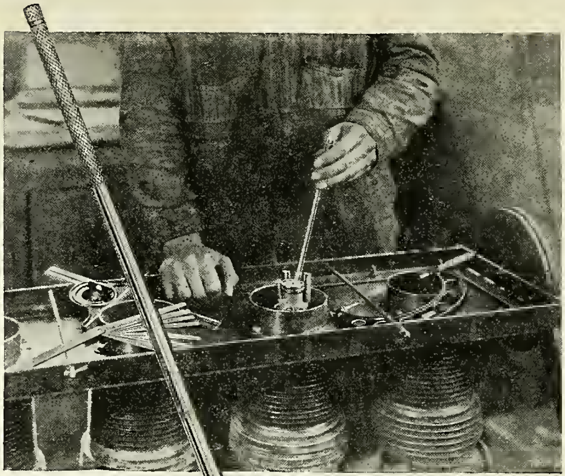
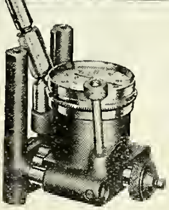
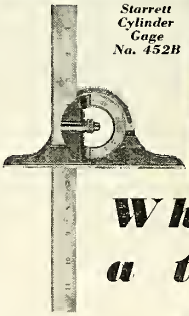




Starrett Cylinder Gage No. 452B

Starrett Micrometer No. 224 AA



Starrett Bevel Edge Protractor No. 490B

When there is a temptation to shove the old pistons back—

Starrett Thickness Gage 172D

A Starrett Improved Cylinder Gage No. 452B will positively tell the true condition of cylinder walls—it eliminates the guessing with an exact answer.

The hardened and ground steel sled—self centering—positive lock—combination rigid and toggle handle—easy reading dial, make the Starrett Improved Cylinder Gage No. 452B an ideal tool to check tapered, out-of-round, or scored cylinders. You can rely on Starrett Accuracy.

The Starret Catalog No. 24 "AD" describing over 2500 Starrett Tools is a reference book worth having. Sent free on request.

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THE L. S. STARRETT CO.
World's Greatest Toolmakers
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(Continued from preceding page)

mercial enterprise—the phenomenon we have waited years to produce.

Of as far reaching commercial significance as this fact is, it is still of greater significance as a military defense measure and as such must be a spectacle for the European observer. Nor does it stop where this article leaves it. Contracts have already been granted to Pan American for the Chile and Peru services, the opening and survey runs of which started about April 1st.

Seventy-two days from then will see New York and Santiago de Chile three mail days apart and the moral alliance that this commercial contact will bring about will stand in the future as the greatest bulwark in the path of wars that man has ever known.

RHOEN GLIDER COMPETITION

(Continued from page 64)

the mentioned location of the cockpit.

The Flugtechnische Abteilung of the Forschungs-Institute constructed a glider with the intention of giving its members the necessary experience in actual building. It is a high wing monoplane, "Rhon-Geist," flown by Kronfeldt of Vienna. The fuselage is of hexagonal type, and contrary to standard glider design, the wing is externally braced on each side by a pair of V struts. The wing span is 52.5 feet; the wing area, 200 square feet; and the aspect ratio, 14. The center section of the wing is straight, and the outer wing portions are trapezoidal in plan form. The wing is of a single-beam type, with a false aileron beam run right through the entire length of outer wing portions. The wing has a very pronounced dihedral and is placed high above the fuselage. The weight of the "Rhongeist" is 344 pounds or 2.46 pounds per square foot of wing area. Despite its unusual construction, the plane displayed excellent characteristics and had a very low rate of descent.

The Mannheimer Ortsgruppe des Deutschen Luftfahrt-Verbandes built a two-seater which could be considered a sister ship to the "Rhongeist." The wing span of this glider is 57.5 feet, and the wing area, 280 square feet (aspect ratio 12). The weight is 463 pounds, and the wing loading as a two-seater, 2.77 pounds per square foot.

An analysis of the general construction and detail of gliders which took part in the Rhoen glider contest discloses an all-round improvement in designs compared to the 1927 competition. Wing constructions, general proportioning and arrangements, all show a marked improvement.

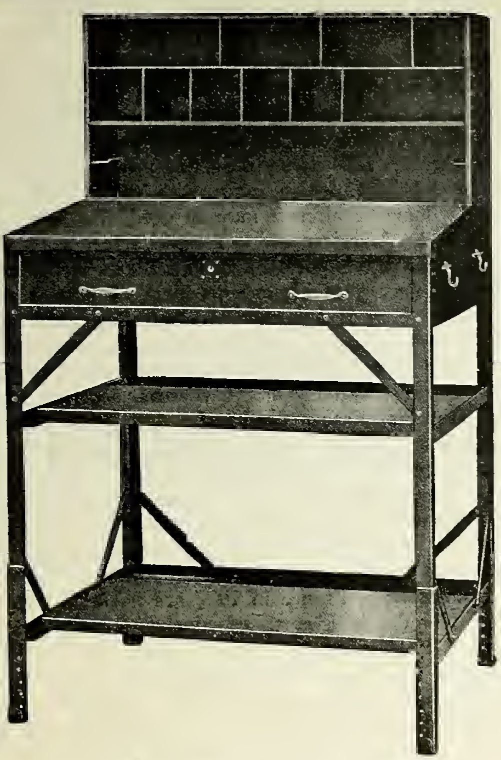
AERONAUTIC BUSINESS TRAINING

(Continued from page 56)

taught by experienced, practical men. In the case of the Universal Schools, all instructors are either executives, pilots or department heads of Universal Aviation Corporation. The lectures are held two evenings a week, the entire course lasting ten weeks.

Universal Aviation Schools are located in a number of cities in the country, and the lectures are usually held in a downtown classroom of the school. Thus the man who is interested in finding a place for himself in this new and rapidly growing industry, by utilizing the experience which he has gained through other connections, can secure his aviation training while employed.

In connection with these schools, the Universal Aviation Corporation maintains a national employment department which functions to secure positions for the graduates from their schools.



No. 38 Desk (See description below)

. . . for Shop Foremen!

All-Steel Adjustable-Height Desk

THE aircraft industry, modern in every sense, will appreciate the modernity and true value of ANGLE STEEL Equipment.

This life-time equipment secures for you real savings in time, labor, energy and operations-handling. It also saves floor space, speeds up work-in-production and guarantees you an investment in permanence.

Send for Catalog "C" which contains over 250 ANGLE STEEL Equipment items for Factory, Office and Shop. A few are: Bench Legs, Cabinets, Tables, Trucks, Chairs, Stools, Machine Tenders, Etc., Etc.

SPECIAL WORK—We fabricate practically anything in angle steel to the specific needs of our customers, when desired. Let us plan, blue print and quote you on your particular requirements. No obligation.

No. 38 Desk (as illustrated). Adjustable 9" in height from 37½" to 46½". Two adjustable and removable shelves. Large steel drawer and top, with various sized compartments, make this an exceptionally practical and convenient desk for foremen and shop superintendents. Legs and frame are of 1¼" angle; top compartment 20 gauge; desk top and two shelves 16 gauge; Width 34", right to left; Depth 28", front to back. Drawer is lock-equipped. Attractively finished in a rich olive-green lacquer throughout.

Angle Steel Stool Company

Agents and Dealers in Principal Cities

PLAINWELL MICHIGAN

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CHICAGO—Lothrop Angle Steel Equipment Co., 325 W. Madison
DETROIT—All Steel Products Co., 333 State

C & L 32

This is one of the most popular blow-torches we have ever made. It is more expensive than the 158 because it is made for much harder use. It is designed for the man who uses a blow-torch in his daily business and demands not only excellent performance but rugged ability to stand rough handling. 32 contains the most advanced, patented C & L blow-torch improvements. It also has a gold-banded red handle. Sure sign of satisfaction.

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An expanded gas orifice makes a blow-torch a piece of junk. And it's the easiest thing in the world to enlarge the orifice in an ordinary torch. But a No. 32 Clayton & Lambert blow-torch has an orifice that *can't be enlarged*—no matter how carelessly or how tight you close the valve. It's a patented Clayton & Lambert improvement—one reason why you get longer service when you buy a Clayton & Lambert.

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DETROIT, MICH.

AERONAUTIC EXPORTS INCREASE

(*Continued from page* 58)

the desire of each producing foreign country to further its own aviation industry through the use of its own products—a condition that is made more difficult by the fact that in certain foreign countries air transport companies receive assistance from the government in the form of subsidies, which carry with them a stipulation that only domestic aircraft may be used, thus cutting off this outlet to American aircraft manufacturers.

Along with the exports of United States airplanes, the production figures of aircraft-producing countries are of significance, even if not always comparable, some giving statistics only, some of quantity only, and some of both. The United States production of aircraft of all types for 1928 was conservatively 4,600 whereas, according to reliable estimates, France produced 1,440, Italy 475, Germany 300, and Switzerland 25. In 1927 the United Kingdom produced approximately 204 commercial airplanes.

It is known that during 1927 France exported about $8,000,000 worth of airplanes, engines, and supplies, with Yugoslavia, Rumania, Switzerland, Germany, and Brazil the leading markets in order of importance; figures of unit exports from France in 1927 are not available. The United Kingdom's exports of airplanes, seaplanes, and parts for 1927 amounted to $5,292,540 and in 1928 to $7,434,700. Germany's exports of planes increased from 54 in 1927 to 61 during the first seven months of 1928. The United States was the leading market for German aircraft, taking 10. Brazil followed with 8, Italy and Switzerland with 5 each, and Austria with 4.

Because of the diversified uses to which airplanes are put in the United States, where there is a wide range in temperature and altitude, together with a large domestic market for aircraft, it would appear that the United States is peculiarly fitted to supply the world market for airplanes in much the same way as it does now for automobiles.

In spite of the favorable prospects indicated by the large increase in United States exports of aeronautic products, the foregoing figures show that our ratio of exports to production was much less than that of European countries and that the American aeronautic industry will have to expend greater effort if it is to obtain and hold secure that place in the growing world market for aircraft and kindred products for which it is so well fitted. The industry has been so busy supplying the large domestic market that only within recent months has it become interested in markets outside of the United States.

(Courtesy of Commerce Reports, Department of Commerce.)

THE MAGNETO COMPASS

(*Continued from page* 74)

The amount of flux passing along the axis of the bar depends upon the angle of orientation and increases until the bar lies in the magnetic meridian. That is, when the magnetizing force is a maximum.

The direction of this flux depends upon which way it is deviated.

This flux is detected by inserting a small rotating section of permalloy in the middle of the main bar. Upon this small rotating section is wound a coil of wire. This constitutes a small two-pole armature which is caused to spin about a vertical axis—an axis fixed with respect to the aircraft.

The two bars are stabilized about the centre of the rotor so that they may lie in horizontal plane whether or not

(*Continued on next page*)

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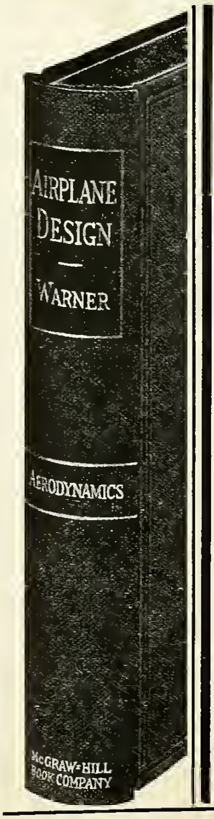

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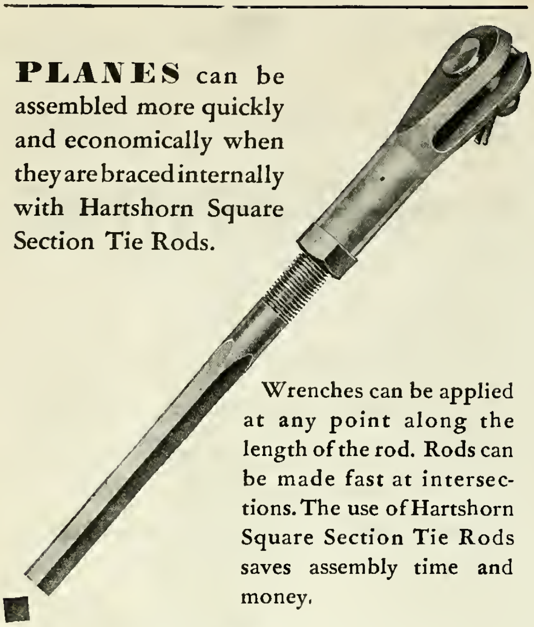

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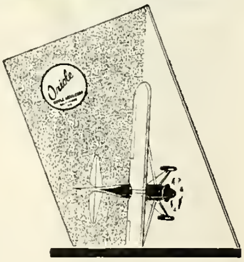

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(Continued from preceding page)

the rotor axis is exactly vertical. This is effected by attaching the transverse axis of the bars to a pendulum. The bars thus mounted on an axle are prevented from disturbing oscillations in the vertical plane by a damper.

The rotor is almost perfectly shielded from any outside flux by flaring the pole tips, only permitting that flux which passes along the length of the bars or pole-pieces to pass into the armature. The spinning rotor cuts the flux which is due to the orientation of the bars and generates an e.m.f. in the coil. The e.m.f. is led to a very tiny two-bar commutator where it is rectified.

Even the movement of the bars through half a degree from the east and west position causes a large change in the value of the generated e.m.f. when using bars each about 12 inches long. This makes the mechanism an exceedingly sensitive detector of the null position of east and west. In fact, such sensitivity is excessive for practical use.

This scheme does not eliminate the commutator but it does eliminate commutator troubles due to its very small diameter and low peripheral speed. Also the voltage to be commutated is several times as much as that of the old type of earth inductor compass. A trial run of three weeks, twenty-four hours a day, was made on the laboratory bench to determine if wear or high resistance spots occurred and developed on the commutator. No cleaning or oiling of the commutator took place during this time, yet at the end of the run no wear was apparent on the commutator and no high resistance contacts had developed.

The pole-pieces of this compass are changed in azimuth instead of shifting the brushes; this is a much more sensitive way of detecting the magnetic meridian and the point at which the flux reverses through the permalloy bars. The brushes are so placed with respect to the pole-pieces that when there is a flux in the bars maximum voltage is generated. The sensitivity (or amount of voltage generated) is not materially reduced when the brushes are shifted ten or twenty degrees from this maximum position.

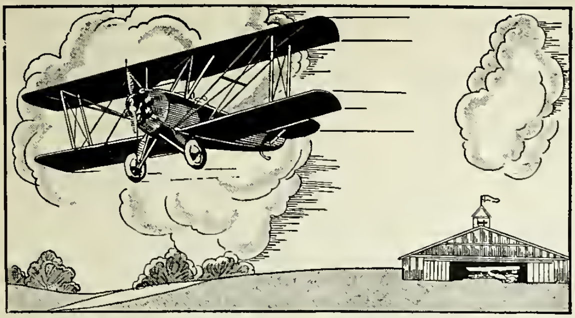
The accuracy of the course held is not affected at all by the brush position:—only by the position of the bars and pole-pieces. In the old type of earth inductor compass, the accuracy of the course depends upon the position of the brushes. Wear of the brushes, which covered nearly twenty degrees of the commutator when carbon brushes were used, would cause quite a serious error in the course indicated. Even with silver brushes this error is serious. Obviously this source of error is absent in the magneto type of compass where the course indicated depends only on the relation of the pole-pieces.

The magneto compass has the following advantages:

1. No universal joint.
2. The stabilized part does not rotate.
3. Greater sensitivity or voltage due to the high permeability of the permalloy bars.
4. Accuracy is not impaired by brush position or brush wear.
5. No commutation difficulties.
6. No oiling or maintenance required due to small parts and very low commutator peripheral speed.
7. It is much smaller and lighter than the old type of earth inductor compass generator.

The magneto compass has emerged from the laboratory stage and test bench stage and is being tested in the air. So far, it has not developed any faults of a fundamental nature.

(Paper presented at Aeronautic Meeting of the S. A. E., Detroit, 4/9/29.)



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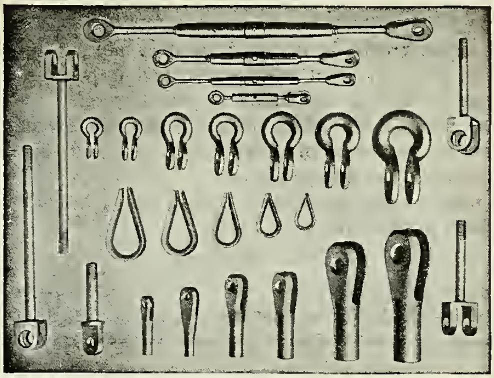

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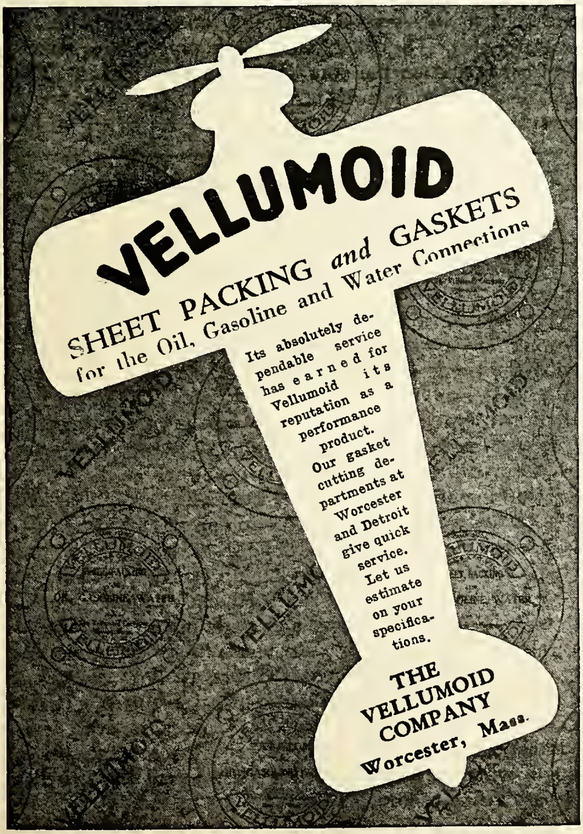

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INTERIORS OF CABIN AIRPLANES

(*Continued from page 70*)

of this arrangement is two-fold; it does not set up disagreeable gusts of wind when open, and it permits each passenger to regulate ventilation to suit himself.

In the rear of the cabin, however, the window on the door lowers by means of a bell crank, and that opposite swings open as an emergency exit.

The seats in the cabin are covered with fabricoid in a tone which matches the gum finish.

Verville Air Coach

Since its first appearance, the Verville Air Coach has attracted much favorable comment because of its clean interior and excellent visibility. In size, lines and appointments this cabin is closely analogous to the modern automobile. All upholstering in the cabin (side walls, ceiling and seats) is of handsome Laidlaw broadcloth. The seats are well cushioned and comfortable; the broadcloth having been applied smooth, contributes to the clean appearance of the cabin.

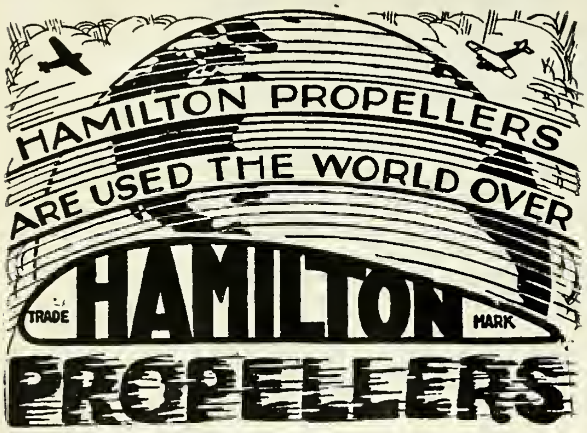
The window sills are of polished wood with figured design border. Beside the rear seats on the window side are ash tray sets contained in a polished rack. A new type of fuselage structure, eliminating the intersection of fuselage truss tubes in the plane of the side windows, makes possible a continuous glass window 40 inches long on each side. Pittsburgh shatter-proof Duplate glass is used in the windows. The side windows slide back and forth to admit ventilation. Two doors, which allow easy ingress and egress, are located abreast of one another aft of the two rear seats. The seats in the cabin are bolted to the tubular structure of the fuselage.

Controls are dual Dep, attractively finished. The Pioneer instrument panel in the ship segregates the flying instruments, placing them in the line of the pilot's vision. There is a map shelf between the control wheels.

Cessna 4-Place Cabin Plane

The passenger compartment of the Standard Cessna 4-place plane is green velour with a brown carpet floor covering. The passengers' seat runs across the cabin, the back being hinged to the large luggage space just to the rear. This arrangement makes it possible for the passenger to reach his baggage at any time during flight. The wing beams provide a head rest both for the pilots and passengers. Windows beside the passenger seats are sliding Triplex glass, and those of the luggage compartment, pyralin.

The pilots' cockpit is finished in green fabricoid. The entire roof of this section is pyralin, fitted to provide an emergency exit. The pilots' seats are equipped with Rusco safety belts; and on the door there is a map pocket. The pilots' seats hinge forward for access to the passengers' compartment.



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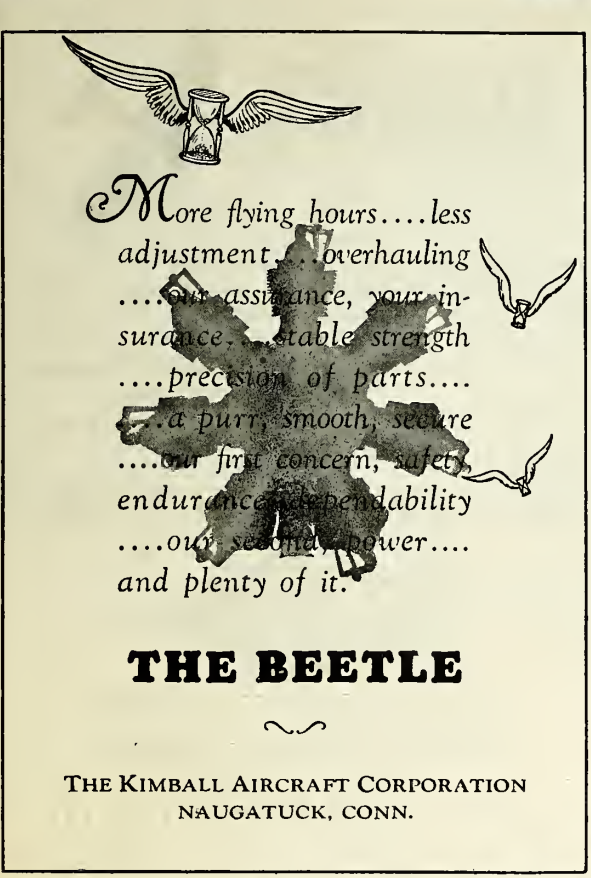
WATER HANDLING OF SEAPLANES

(*Continued from page 53*)

spreader struts and guided by the ring or cleat at the bow of the float, is recommended as the most satisfactory method.

When leaving a mooring, exactly the reverse should be followed. The permanent mooring lines are first released, leaving the single temporary line in the hands of a passenger, who is standing on one of the floats. The plane is then drawn up by means of this line until the buoy is within easy reach, so that it can be quickly eased off as soon as, but not before, the motor is started.

In working to a low dock or float, which will clear the wings of the plane, it is advisable to approach from alongside, instead of directly toward it, if the wind conditions permit. With this method a wing tip can be conveniently seized by a helper on shore and with the switches cut the ship is easily drawn alongside and made fast. This method may also be used even if help on shore is not available, since a passenger standing on the inboard float can grasp the dock and satisfactorily fend it off, if required. If the dock is so high that the wings will not pass over, it is advisable either to idle alongside so that a wing tip is brought within a helpers reach, or else to cut the switches and pass a line ashore.



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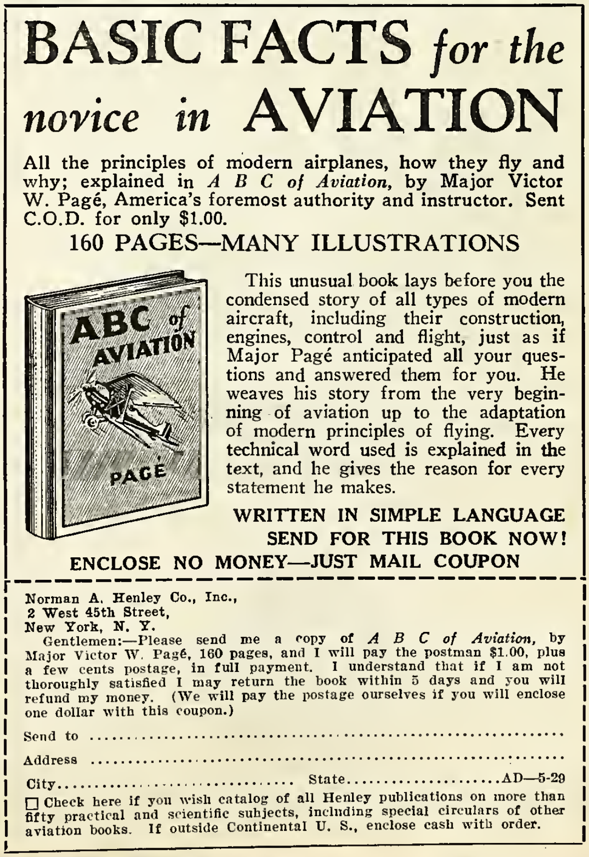

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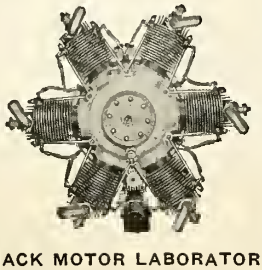

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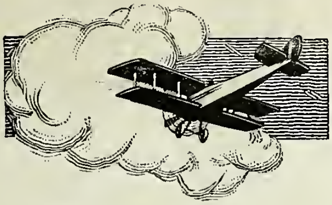

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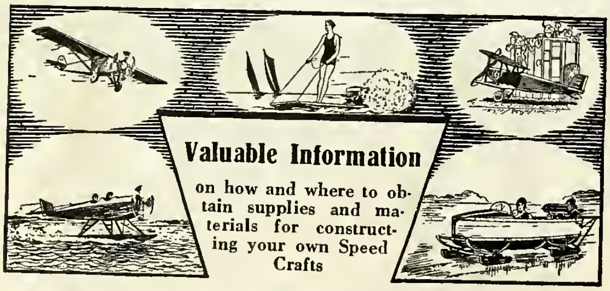

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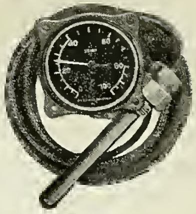

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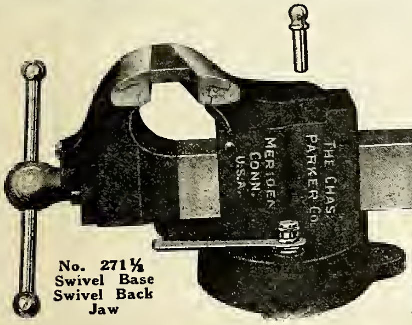

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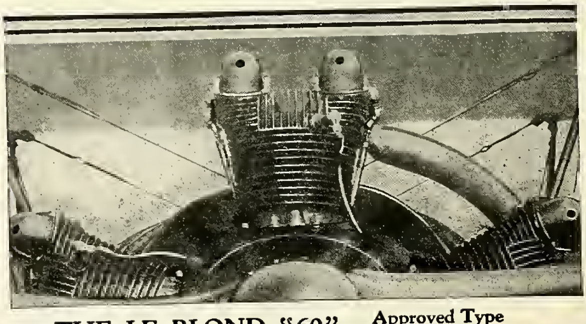

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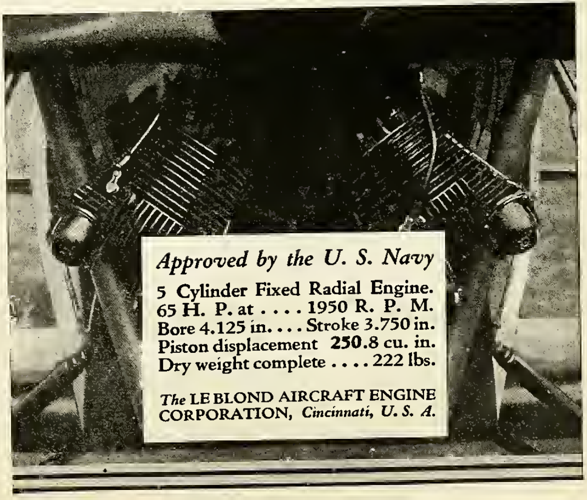

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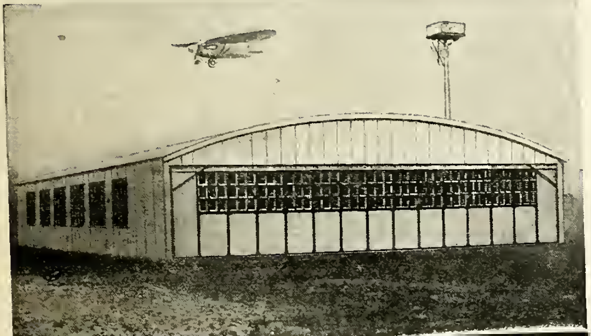

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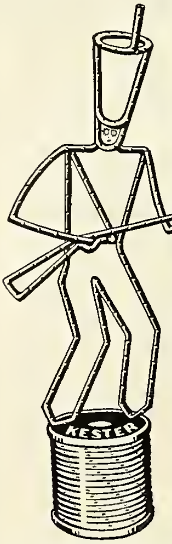

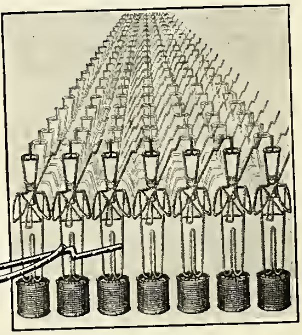

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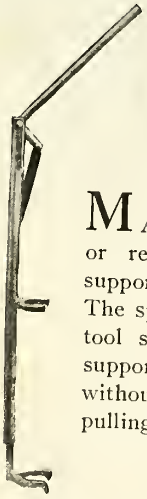

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of AERO DIGEST, published monthly at New York, N. Y., for April 1, 1929.
County of New York, } ss.
State of New York, }

Before me, a Notary Public in and for the State and county aforesaid, personally appeared Frank A. Tichenor, who, having been duly sworn according to law, deposes and says that he is the Business Manager of the AERO DIGEST, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, The Aeronautical Digest Publishing Corp., 220 West 42nd St., New York, N. Y.; Editor, George F. McLaughlin, 220 West 42nd St., New York, N. Y.; Managing Editor, None; Business Manager, Frank A. Tichenor, 220 West 42nd St., New York, N. Y.

2. That the owners are: The Aeronautical Digest Publishing Corp., 220 West 42nd St., New York, N. Y.; Abram Horsfall, Martinsburg, West Virginia; Frank A. Tichenor, 220 West 42nd Street, New York, N. Y.; J. E. Horsfall, 220 West 42nd St., New York, N. Y.

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(Signed) FRANK A. TICHENOR.

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SAFE FLYING

By

Capt. A. S. White, A.F.C.

(*Courtesy of* D H Gazette)

FLYING is safe, and has been safe for a number of years. To-day the light aeroplane is so easy to fly and so reliable, and the technique of the numerous first-class instructors who abound in nearly every country in the world, the result in most cases of many years' experience, not only in the art of flying, but in the art of teaching others to do so, has reached such a high standard, that there is nowadays seldom any excuse for giving certain daily papers the opportunity to blazon their pages with the news that someone has crashed.

And yet so-called "accidents" do happen, with a far greater frequency than should be the case; and often all that the public ever knows about an occurrence of this kind is gathered from a highly-coloured and usually inaccurate description of an "eye-witness" (who, incidentally, nearly always happens to be working in his garden nearby) and, perhaps, a photograph of the wrecked machine, if the newspaper is "lucky" enough to be able to obtain one.

If an authoritative explanation is ever offered, it certainly rarely blames the machine, but usually assigns the catastrophe to an "error of judgment on the part of the pilot"—all of which is unsatisfactory, and tells us nothing. What we want to know is what caused the pilot to commit this "error of judgment"—how did he come to find himself in difficulties? Was he doing something which any prudent person would know to be attended with danger, and, if so, what motives actuated him; or, on the other hand, is his judgment in the air inherently bad, in which latter case he obviously needs further instruction to improve his judgment? The last contingency in these days may, it is submitted, be disregarded as a general rule, for the reason that it is a point, not so much of honour, but of obvious policy, among qualified instructors, not to let their pupils go solo until they are perfectly satisfied of their complete competence in the air. Thus, we are forced to the conclusion that the pilot was for some reason flying his machine in a manner which would be discountenanced by any good instructor.

What is this reason likely to be? In the vast majority of cases, it is simply—Vanity. Vanity has ever been condemned as a sin in human beings. In nothing have the warnings against it been more justified than in flying.

A young pilot and, alas, sometimes an old one, is anxious to show his skill and intrepidity to an admiring crowd, or individual. He thinks, "I am much too high up here, they cannot see me clearly enough, or appreciate the wonderful things I am about to show them, so I will come down just above the trees, and give them a show, and maybe scare them a bit, and then they will think all the more of me." Very well, he does so. His mind and his eye wander to the onlookers, from whom he seems to hear paeans of admiration, and then—"Good Lord, I never saw that tree," or else he stalls on a turn, or finds himself unable to clear a row of building or some telegraph wires and, voilà, his flying for that day, at least, is finished. If he is lucky he only gets into trouble, gives the newspapers a scoop and helps the public to get fed up with aviation. If only he had kept his mind concentrated on his flying and left his audience to look after themselves and to reflect on the safety and convenience of aerial travel, he would not have made a fool of himself and earned the whole movement a black mark. A first class pilot, like a first class actor, does not remember that an audience exists.

Another fruitful cause of mishaps is panic. A pilot gets lost, sees nothing he recognizes, and, instead of taking things calmly, finding the direction of the wind, picking a field and then flying low over it several times to make sure that the surface is suitable for a landing and that there is nothing to prevent him from getting out of it again, he usually panics, shuts his engine off with a rush, then either forgets its existence or opens his throttle so violently that he chokes it, with the result that he makes, at the least, a landing that is emphatically not worth writing home about. It is better to go round ten times, if by doing so it can be better ascertained that all is well for landing, than to go round once and then to hit some obstacle.

One of the soundest pieces of advice that an instructor can instill into his pupils is that, in any but extraordinary weather conditions, there is no excuse for a crash, provided the engine is functioning. If such a thing should happen, a momentary panic is perhaps understandable, but even in this unlikely eventuality, observance of the two safety factors in flying will afford the pilot every chance of making a safe landing. These two factors are:—

Speed.—Always keep at least 15 m.p.h. in hand above the known stalling speed of the aircraft which is being flown. The modern machine is fitted with very reliable air speed indicators, and the habit of checking speed by them is entirely advantageous.

Height.—Stunting near the ground and low flying generally are the primary causes of nearly every accident which happens to-day. Given sufficient height, any mistake can easily be rectified and, in the remote event of engine failure, height will give the pilot ample time to recover from any momentary fright and coolly to set about the business of landing. According to his height, so will his choice of fields be enlarged and, with plenty of height allied to sufficient speed, he will have a large selection.

The habit of flying unnecessarily close over country or towns is bad; for instance, if a sizable wood lies on the route, either fly high over it or, if for any reason that is impossible, then go round the edge. It takes very little effort, and it is a wise plan to endeavour always to have landable ground within reach, even if an emergency should never arise. In the earlier days when forced landings were quite a frequent occurrence, pilots were always on the *qui vive,* selecting fields, ascertaining wind conditions and metaphorically making forced landings. Even to-day this is a habit well worth cultivating, and with a little practice becomes effortless, fields being noted unconsciously. It helps to dispel the ennui of long periods in the air and, if a forced landing ever has to be made, the direction of the wind and suitable landing fields in the vicinity are already known—a most valuable consideration.

To sum up then, the golden rules for safe flying are: do not show off, fly high, keep up your speed, keep cool, and keep your eyes open. This string of injunctions may look formidable, but a little reflection will show that in reality they are nothing but common sense. The task of piloting an aeroplane is far less exacting than that of driving a motor car; a pilot can spend in the air many more hours without a break than are possible on the road. If these few simple and obvious rules are observed, flying will become even safer than it is to-day, and nobody will be the loser.

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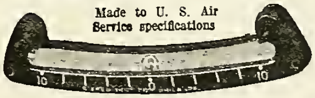

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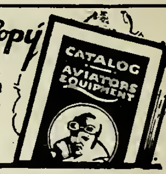

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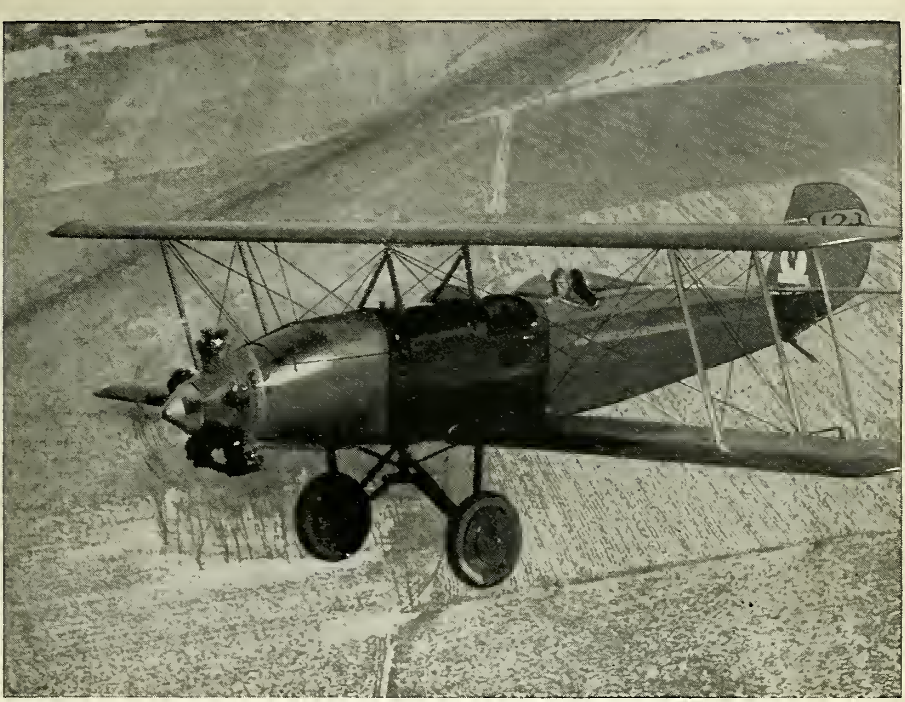

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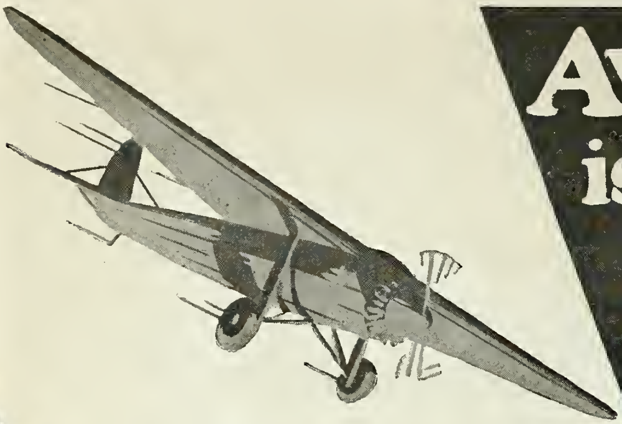
(Signed) L. G. MASON,
President Montgamery School of Aeronautics; Montgomery, Alabama

AMERICAN EAGLE AIRCRAFT CORP. FAIRFAX AIRPORT
KANSAS CITY · KANSAS



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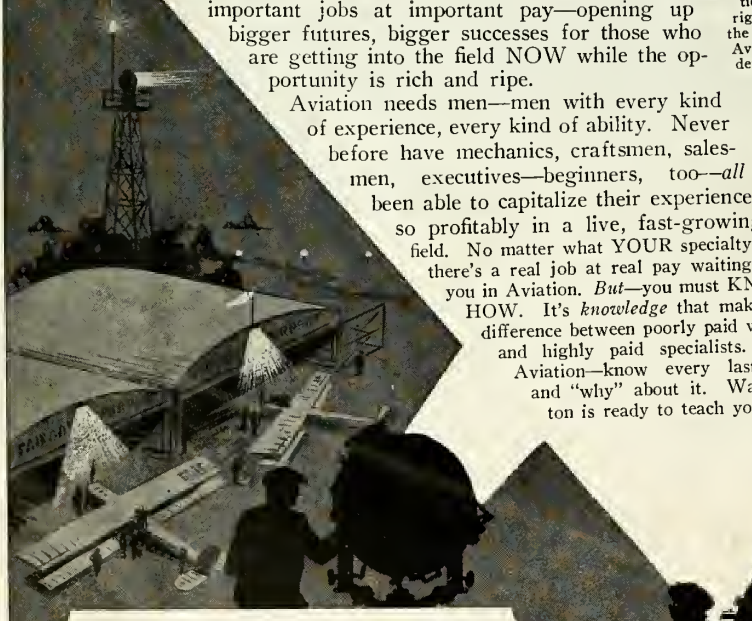

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Aircraft Industry

Enjoys Unique Advantages in Los Angeles County

32% of the aviation activity in the entire United States centers in Southern California. (U. S. Dept. Commerce)

Available investigations by meteorologists, industrial engineers and aviation authorities show conclusively that atmospheric, geographic, industrial and other conditions here are particularly favorable to aviation industry.

12 major factories are now manufacturing airplanes and aircraft motors here. Highest type, experienced, skilled labor is available; 20% of all licensed pilots; 20% of all identified aircraft; 25% of all aviation schools in the United States are in Southern California.

There are 50 or more airports and landing fields in Los Angeles County alone. (See graphic map at left).

Climatic and other conditions are bound to make this the aviation capital of America. The advantages of this immediate territory are not to be had elsewhere.

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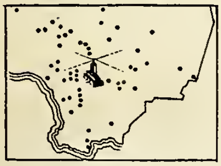

Above map shows part of Los Angeles County. Every dot represents an airport or landing field.

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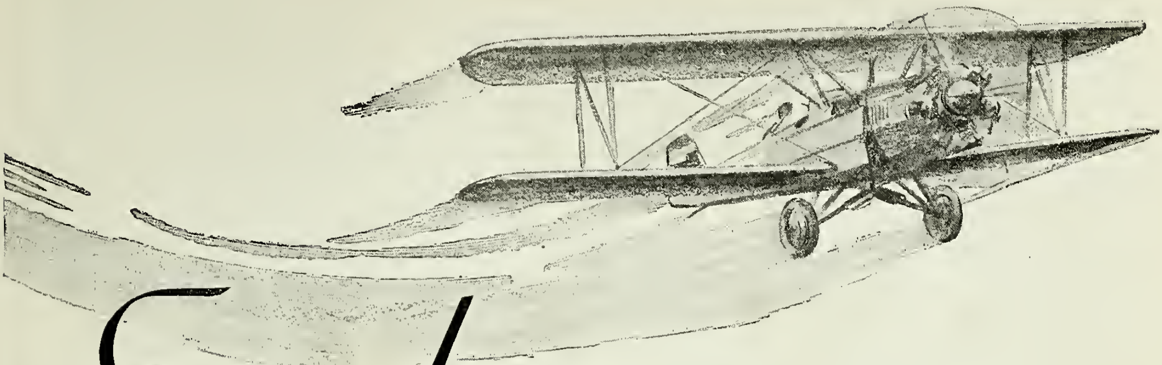
Rated horsepower at sea level—150. Bore—4.5". Stroke—5.5. Compression Ratio—5 to 1. Piston Displacement, cubic inches—612.15. Revolutions per minute—1800. Weight—450 lbs. Fuel consumption, cruising speed, pounds per h.p.—.5. Oil consumption, cruising speed, pounds per h.p.—.016.

FREE as the air it commands—poised and sure as the bird it honors—unlimited in range as the broad horizon, the Black Eagle soars to Supremacy of the Skies.

You who have yet to experience the fleet, smooth flight of COMMAND-AIRE'S flowing lines—who have yet to glory in the tremendous power, compactness, positive control, and sense of snug security in this trim, stable, graceful ship powered by Axelson—you indeed have yet to thrill at what sound engineering has done convincingly, for the advancement of aviation.

For, in this splendid combination of correct plane construction (embracing 10 cardinal points of exclusive development) and



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the super-power of Axelson's sturdy 7-cylinder, static, radial, air-cooled engine, COMMAND-AIRE contributes a brilliant new achievement among 3-place open type ships.

To you who judge by specifications, we will furnish an impressive catalogue. But first let the Black Eagle convince you by inspiring flight, with what skilled craft this catalogue has been synchronized into the sweetest ship aloft.

To arrange for a demonstration and secure complete literature and specifications, write either address below.

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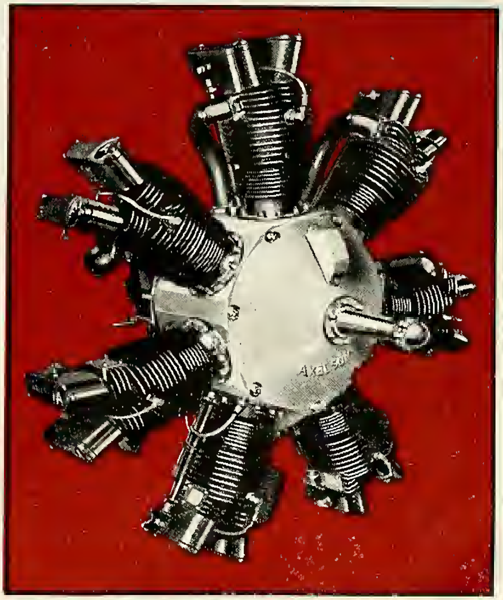

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AXELSON

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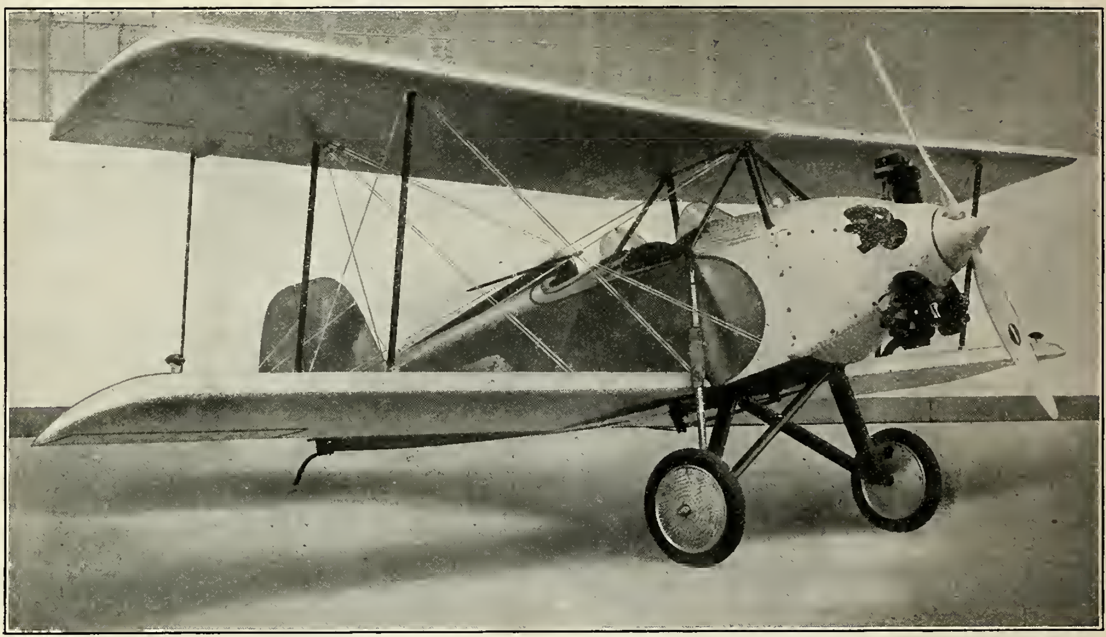

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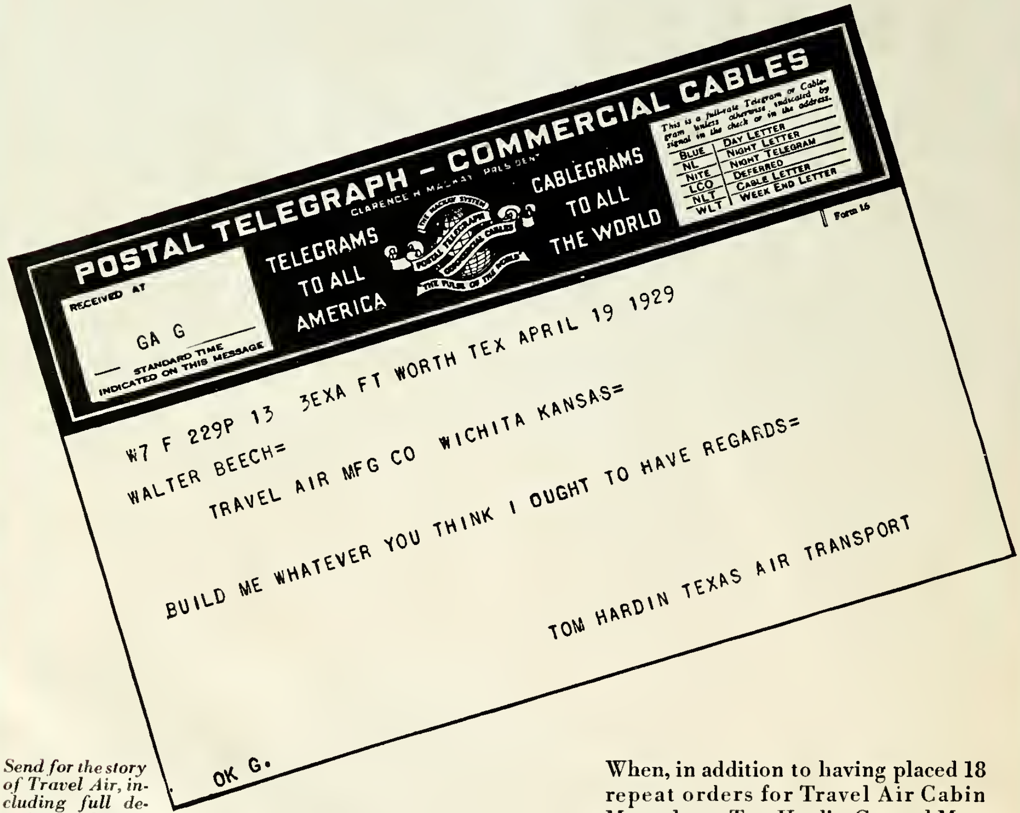

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Form 16

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TRAVEL AIR MFG CO WICHITA KANSAS=

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TOM HARDIN TEXAS AIR TRANSPORT

OK G.

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When, in addition to having placed 18 repeat orders for Travel Air Cabin Monoplanes, Tom Hardin, General Manager, Texas Air Transport, sends this telegram relative to a Travel Air plane for his private use, there can be but one thought in his mind. Confidence! Complete confidence in the manufacturer and the product.

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COMPANY

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"THE STANDARD OF AIRCRAFT COMPARISON"

QUESTIONNAIRES prove nationwide *satisfaction* in TRAVEL AIR

QUESTIONNAIRE

1. When did you purchase your Travel Air Plane?
   Feb. 14, 1927.
2. What is the Serial Number on your plane?
   159.
3. Have you always been satisfied with it?
   Plenty.
4. If so, will you please name the features that appeal to you most forcibly in this plane?
   Travel Airs stand the gaff—in Texas it must stand it or out you go.
5. If not, what have been your difficulties?
   Not enough flying to wear them out.
6. Have you any suggestions to offer?
7. Have you always received satisfactory service and shipment on parts?
   Yes, very.
8. In general, how are you satisfied with Travel Air Products, and would you buy another Travel Air if we had a model that would suit your requirements?
   It's not if you had a model that would suit my requirements, it's as soon as I can raise the money to buy one of the big monoplanes.
9. May we quote you in our advertisement?
   Sure.

Louis E. Derryberry

A short time ago Travel Air sent a Questionnaire to all Travel Air owners, now numbering over 1000. The answers are coming in rapidly. A 100% response is expected. Here are two of the replies. Others will be published in the near future.

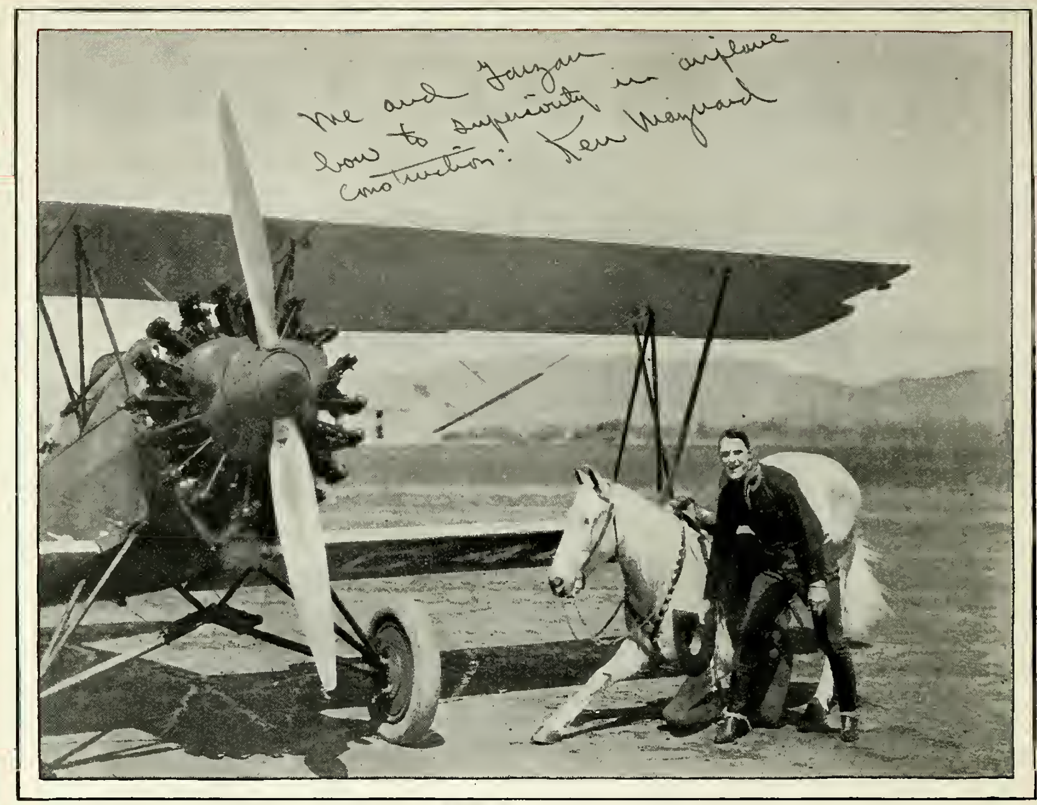
QUESTIONNAIRE

1. When did you purchase your Travel Air Plane?
   Nov. 25, 1928.
2. What is the Serial Number on your plane?
   782.
3. Have you always been satisfied with it?
   Perfectly.
4. If so, will you please name the features that appeal to you most forcibly in this plane?
   My Travel Air J5 Biplane gives a dependable security, due to its inherent stability and it being remarkably responsive to its controls.
5. If not, what have been your difficulties?
   No difficulties.
6. Have you any suggestions to offer?
   None.
7. Have you always received satisfactory service and shipment on parts?
   Splendid.
8. In general how are you satisfied with Travel Air Products, and would you buy another Travel Air if we had a model that would suit your requirements?
   Yes.
9. May we quote you in our advertisement?
   Yes.

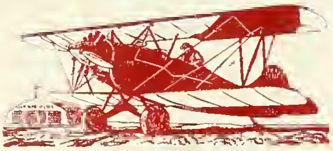
Dean S. Clarke
Shreveport La.
(Postmaster)

A new edition of the story of Travel Air, describing all 11 types of Travel Airplanes including the new four place Cabin Monoplane, will be sent free on request.

TRAVEL AIR COMPANY · *WICHITA, KANSAS*

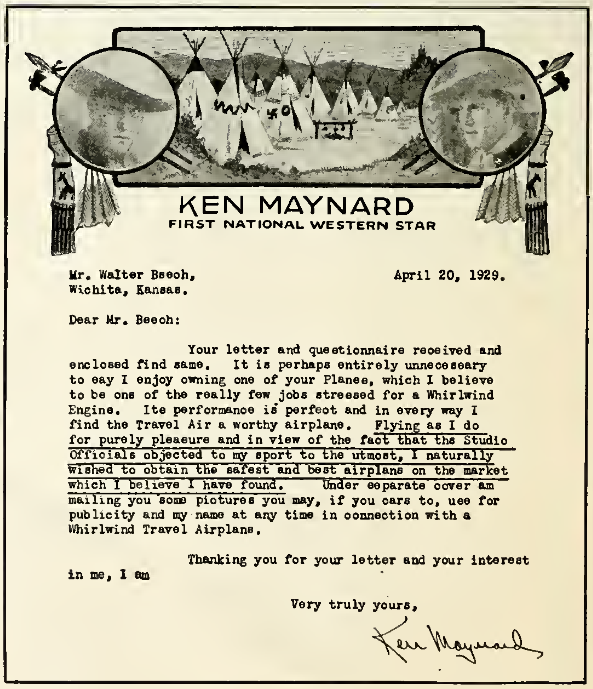


Me and Tarzan bow to superiority in airplane construction! Ken Maynard



In selecting a plane, Ken Maynard placed emphasis, above all, on dependability. It is not surprising that he chose Travel Air—nor that he has become one of Travel Air's hundreds of enthusiasts.

The new Travel Air catalog, now on the press, illustrates and describes all Travel Air models—3 types of Cabin Monoplanes and 8 types of Biplanes—a complete line to fill every need. Free on request.



KEN MAYNARD
FIRST NATIONAL WESTERN STAR

Mr. Walter Beech,
Wichita, Kansas.

April 20, 1929.

Dear Mr. Beech:

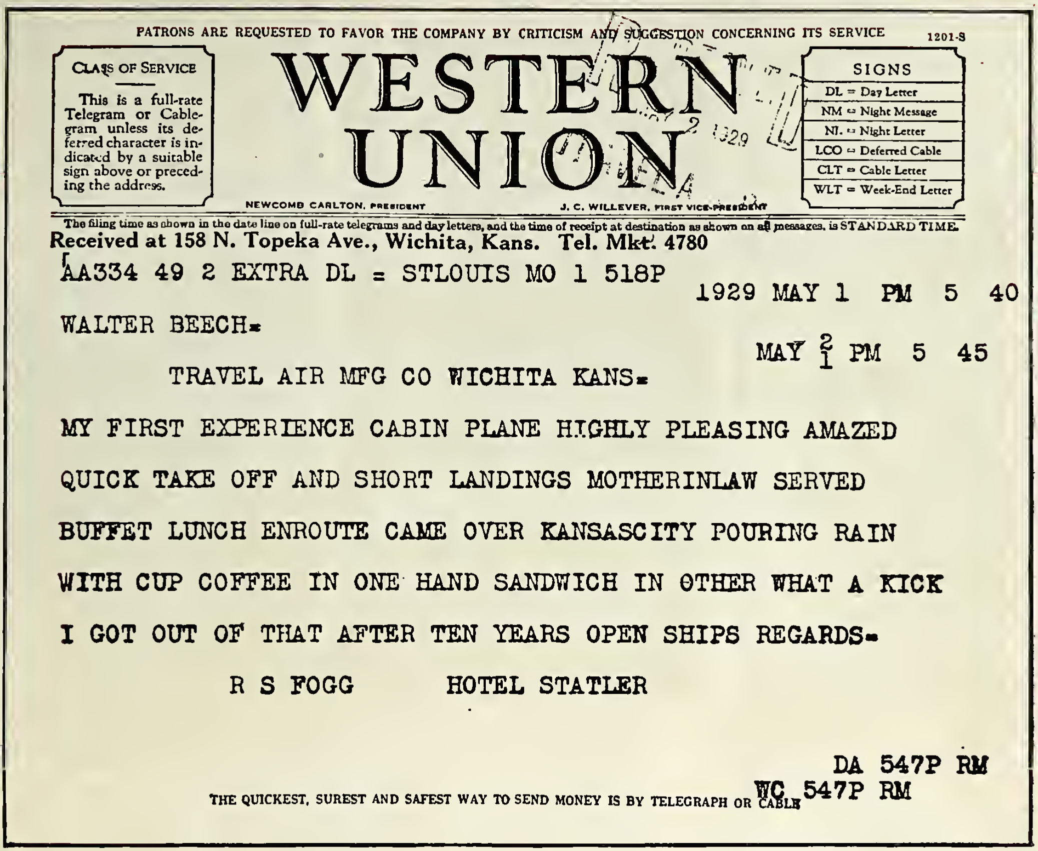
Your letter and questionnaire received and enclosed find same. It is perhaps entirely unnecessary to say I enjoy owning one of your Planes, which I believe to be one of the really few jobs stressed for a Whirlwind Engine. Its performance is perfect and in every way I find the Travel Air a worthy airplane. Flying as I do for purely pleasure and in view of the fact that the Studio Officials objected to my sport to the utmost, I naturally wished to obtain the safest and best airplane on the market which I believe I have found. Under separate cover am mailing you some pictures you may, if you care to, use for publicity and my name at any time in connection with a Whirlwind Travel Airplane.

Thanking you for your letter and your interest in me, I am

Very truly yours,

Ken Maynard

TRAVEL AIR COMPANY · *WICHITA, KANSAS*



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WICHITA, KANSAS

How Does Air Associates, Inc., Serve?

The ways that Air Associates, Inc., serves Aviation are many and diversified. The various branches of A. A. Service listed in the right hand column on this page tell best how Air Associates is supplementing the work of the manufacturer, the airport operator, the transportation executive and the individual owner, to bring Aviation to maturity.

IN NEW YORK CITY

At 535 Fifth Avenue, in the towering Bank of United States Building, are the executive offices of Air Associates, Inc. Here, on the street level, with entrance directly on 44th Street, is the smartly furnished Air Passenger Bureau for the public and deluxe trade Show Room—occupying 800 square feet in one of the most sought for locations in the world. Situated as it is, in the exclusive midtown shopping, hotel and theatrical district, a stone's throw from Grand Central Station, Air Associates' Headquarters is the chief aviation landmark of New York. It is here that the air-minded New York public seeks information on every phase of air travel and on aviation matters generally.

AT ROOSEVELT FIELD, L. I.

On Roosevelt Field No. 2 (formerly Curtiss Field) Air Associates maintains two of the most prominent hangars on the field, just inside the entrance. The buildings house commodious stores, stock rooms, shops, repair and rest rooms and provide 15,000 square feet for storage space.

AT CHICAGO AIRPORT

At the Municipal Airport, Chicago, Air Associates is now completing a supply and service establishment that will long be a model for a service plant on any American airport. A handsome two-story building with a total floor space of 32,000 square feet is being erected and will be equipped with every facility for the handling and storage of aircraft, and for competent technical service and distribution.

AIR ASSOCIATES INC.

EXECUTIVE OFFICES
535 FIFTH AVENUE
NEW YORK

●

NEW YORK SERVICE STATION
ROOSEVELT FIELD
(Address Garden City, N. Y.)

●

CHICAGO SERVICE STATION
MUNICIPAL AIRPORT
(Address 5300 W. 63rd St., Chicago)

DIRECTORS of Air Associates, Inc.

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President Air Investors, Inc.

"A. A." FOR EQUIPMENT

Air Associates provides a reliable, convenient source of supply for

Airplanes of repute
Approved Engines and Parts
Proven Pontoons
Laboratory tested Propellers
Shop and Field Machinery
Airport Lighting Equipment
Precision Instruments and Tools
Standard Spares
Specified Steels and Durals

See A. A. Catalog for complete listing.

"A. A." FOR SUPPLIES

Air Associates are distributors, wholesale and retail, to dealers and individuals for—

Manufacturers' Materials
Plywood, metals, waste, shelving, etc.

Aircraft Hardware
Clevises, bolts, terminals, turnbuckles, etc.

Automotive Supplies
Soaps, paints, tapes, hosing, etc.

Flying Accessories
Clothes, goggles, helmets, etc.

Pilots' Requirements
Maps, logs, special instruments, etc.

Students' Necessaries
Tool kits, books, pins, togs, etc.

Public's Wants
Photos, magazines, models, etc.

Fuels, oils, dopes, lacquers, etc.
See A. A. Catalog for complete listing and dealer discounts.

"A. A." FOR SERVICE

Private owners' maintenance
Engine check, wash, fueling, etc.

School Maintenance
Periodic engine and plane checks.

Engine Overhaul
Expert and authorized.

Complete Rebuilding
of airplanes, any type.

Laboratory Service
On instruments, electrical accessories, propellers, etc.

Night Watchman—Fire Protection First Aid

Trucking, Loading and Assembly
All maintenance and service work is handled by men who have had engineering and production training.

"A. A." FOR TRANSPORTATION

Air Associates are recognized Headquarters for Tickets on all established air lines and sightseeing tours.

SPECIAL CHARTER

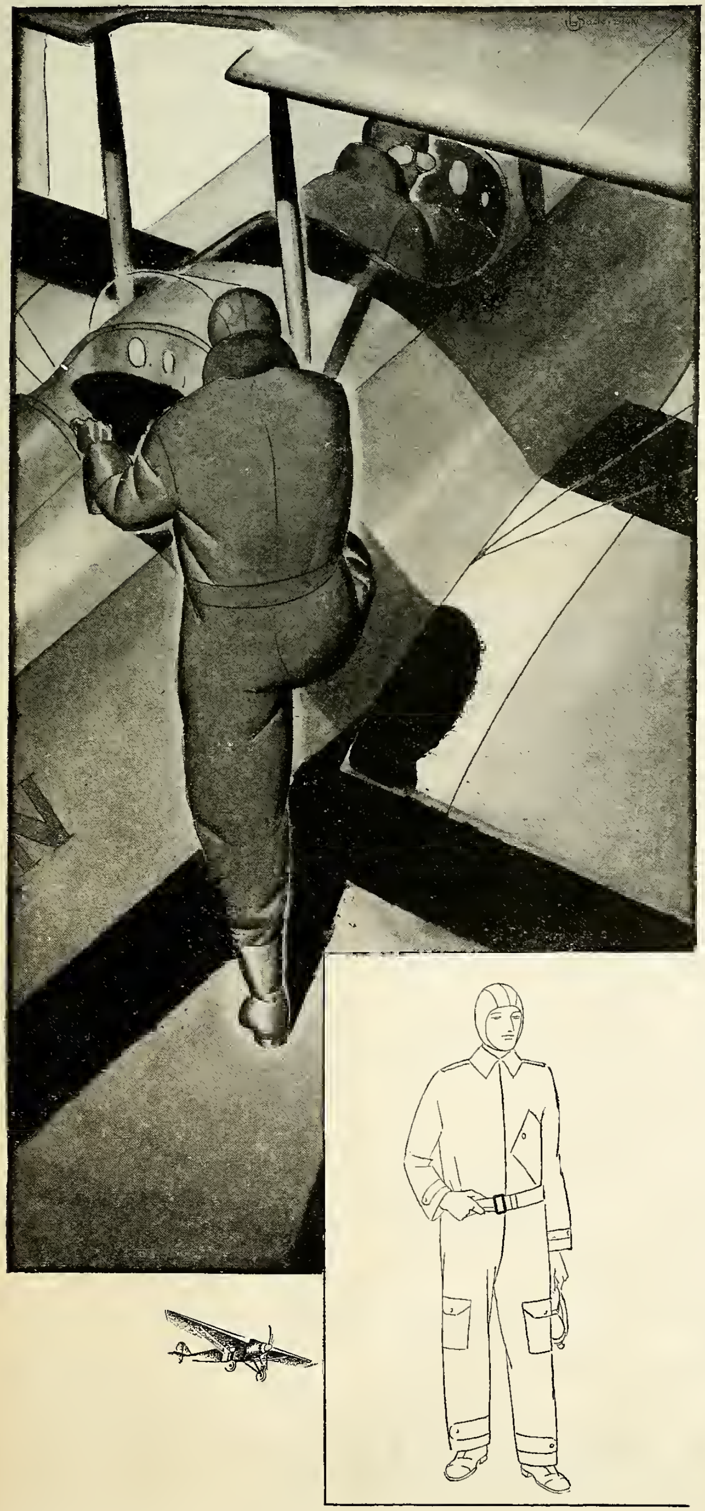
Tri-motored planes, single engine cabin planes, three-place open planes, flying boats, amphibians.

Foreign

Air Associates also represents the European air lines.

Best rates—Prompt and Experienced Service

A Hint to Pilots about to Take off



and put on . . .

Phew! Getting warmer. Time to *take off* —to take off those heavier winter flying suits . . . . and *put on* togs whose sole purpose in life is to keep you coolly comfortable.

May we modestly suggest Spalding Summer Flying Togs?

Here are clothes designed by men who've learned about sweltering, tricked-up togs by the sweat of their own brows. Such warm understanding breeds suits as *light* as a wisp of cloud—as *cool* and *airy* as 10,000 feet up—and as *practical* as a three point landing . . . . .

You'll find some models of special cotton cloth, as low as $9.00. Particular pets of ours, these $9.00 models, one-piece style, belted, and strapped at wrist and ankles. And with three flap pockets, on knees and chest, for waste, maps, and things.

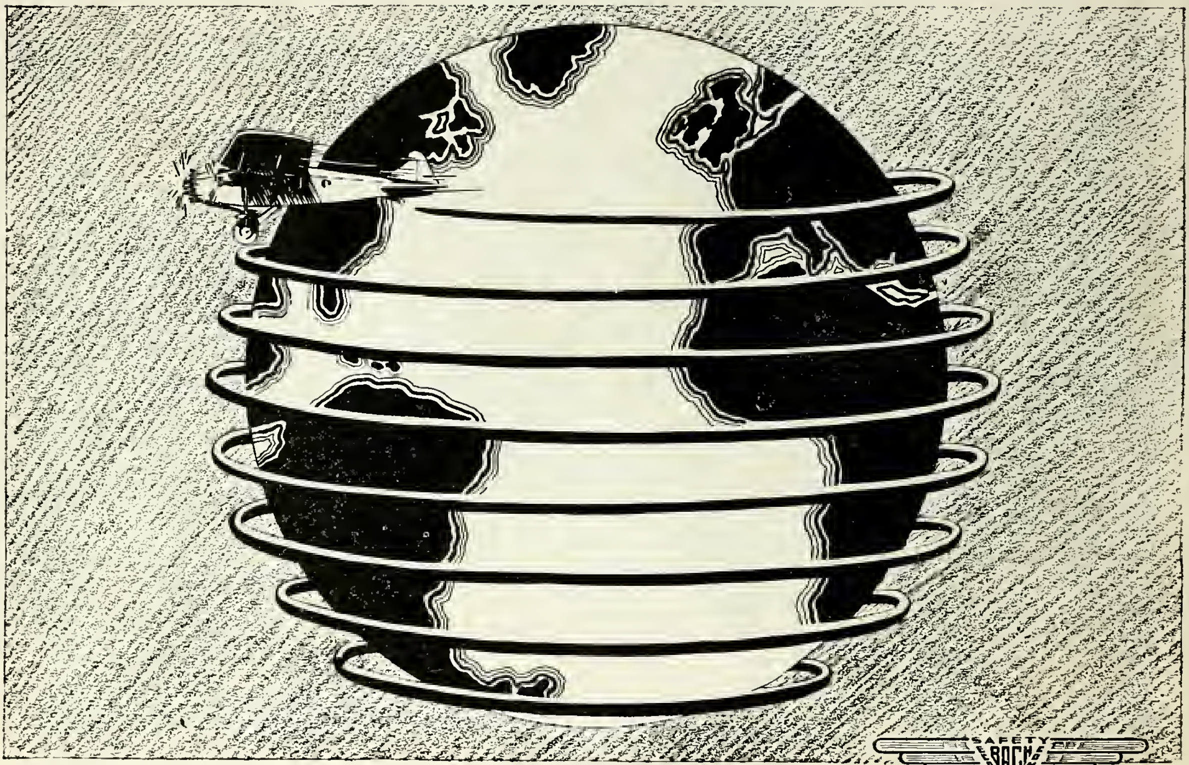
And don't forget — Spalding Togs are styled to proclaim the *flier,* rather than the filling station assistant. Other Summer models at $12.00, and on up to $40.00 for waterproofed light-weight wool gabardine suits.

Contact at *any* Spalding store! Or write for free catalog to A. G. Spalding & Bros., 105 Nassau Street, New York City.

© 1929, A. G. S & B.

A. G. Spalding & Bros.
AVIATION EQUIPMENT

EIGHT TIMES AROUND THE WORLD



DEPENDABLE *PERFORMANCE!*

. . . the first Bach Tri-Motor Ten Passenger Transport is still in daily schedule service after 200,000 flight miles . . .

equal to 8 times around the world!

BACH AIRCRAFT COMPANY INC.

LOS ANGELES METROPOLITAN AIRPORT , VAN NUYS, CALIFORNIA

A MERCHANDISING MART IN STEP WITH THE INDUSTRY

1929 NATIONAL AERONAUTICAL EXPOSITION

THE nation's aeronautical buying power will be concentrated in Cleveland August 24th to September 2nd for the industry's most representative aircraft show — the 1929 National Air Races and Aeronautical Exposition.

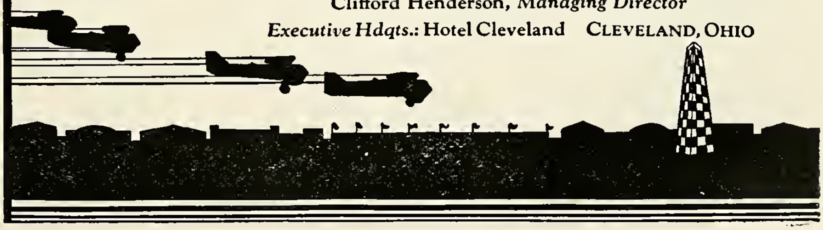
This mammoth project, conceived and developed along economic and constructive lines, serves the aircraft industry as a necessary factor in its general marketing program. As a pageant of aeronautical progress it depicts the industry's physical achievements in a rich colorful setting — reaffirms to members the true significance of their industry — builds confidence upon which the future prosperity of the industry depends—and creates a greater interest in the potential possibilities of aeronautics.

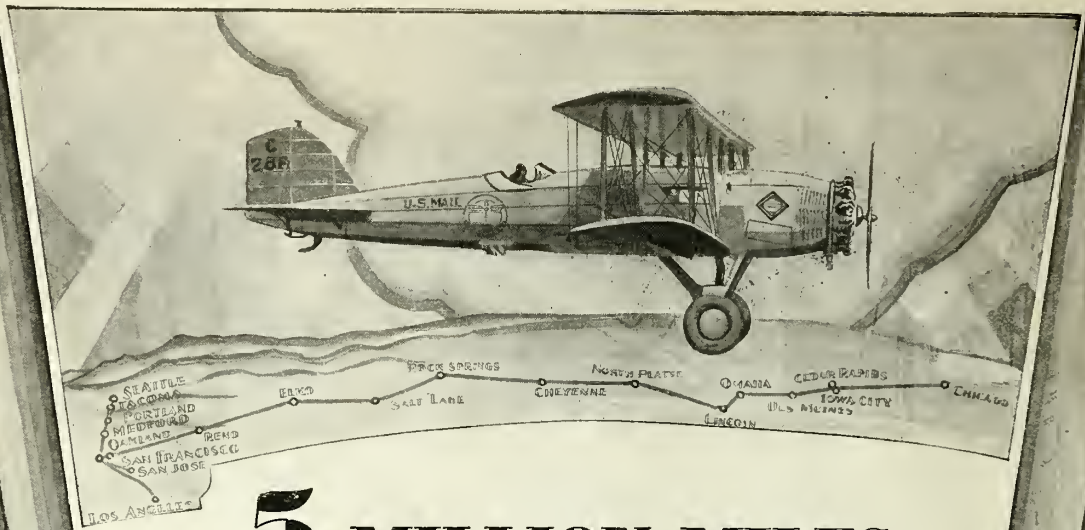
At this annual assembly will be massed the industry's flying, engineering and executive personnel, officers in the flying branch of the Government services and thousands of pilots old and new all of whom make up the ultimate market.

To exhibit in the National Aeronautical Exposition is to share in the benefits to be derived from contacting not only thousands in the industry who will attend but the great masses who will be attracted by the colorful racing program. Detailed information will be sent on request.

NATIONAL AIR RACES

CLEVELAND NATIONAL AIR RACE AND SHOW CORPORATION
Clifford Henderson, *Managing Director*
Executive Hdqts.: Hotel Cleveland CLEVELAND, OHIO





5 MILLION MILES *with Boeing planes*

AT midnight, April 29, Boeing System, operating the two longest air mail-express and passenger lines in America, finished the flying of 5,000,000 miles, AN INTERNATIONAL RECORD!

Two hundred times around the earth, in fair or foul weather. Forty-six per cent, or 2⅓ million miles, between sunset and sunrise. Pilots in wool and fur to conserve body heat against an arctic 35° below zero—combating ground temperatures of 135° Fahrenheit. Heavy air at sea level. Light air at 16,000 feet. Airports more than a mile apart vertically. Heaviest loads at highest altitudes. Five mountain ranges.

Despite these extremes of altitude and temperature, and length of routes, Boeing System, with Boeing-built planes, carried 85,000,000 letters, thousands of express shipments and 6,000 passengers, *with a performance record never before reached in the history of flying.*

Ordinary planes could not have flown this five million miles, *on schedules,* on the transcontinental and Pacific Coasts.

The planes Boeing builds, in the nation's largest airplane factory, are developed from millions of miles of flying. They have proved, in action, they have "the stuff". Demand that same quality, safety, and economy of operation in the plane *you* buy.

BOEING AIRPLANE COMPANY, Seattle, Wash., *Division of United Aircraft & Transport Corporation.*

BOEING

Boeing Offers the Following Models for Early Delivery

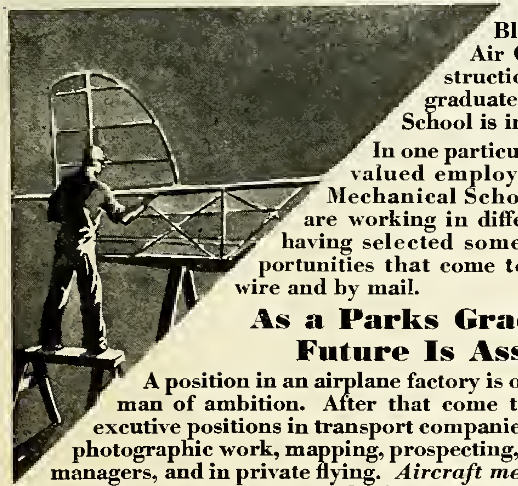
(All performance figures, based on maximum payload, are guaranteed, not estimated)

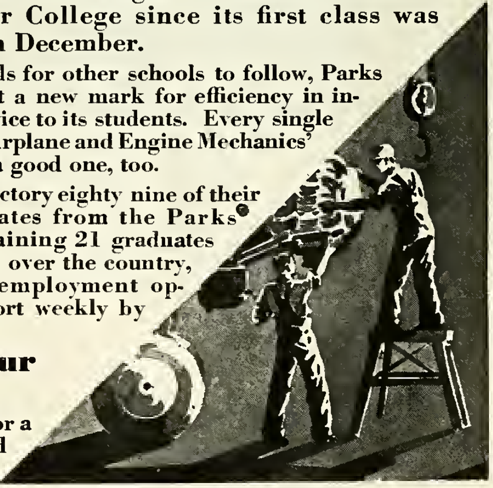
Write Boeing Airplane Company, Seattle, Wash., for catalog on various models.	**"95"**	**"40-B4"**	**"40C"**	**"100"**	**"204"**
	High speed, large capacity, mail, cargo, biplane	Mail, cargo, 4-pass. and pilot, cabin biplane	Mail, cargo, 4-pass. and pilot, cabin biplane	High speed, single seater land sport biplane	Five pass. and pilot, cabin flying boat
Empty	3196 lbs.	3722 lbs.	3522 lbs.	1805 lbs.	3358 lbs.
Pay or useful load	1610 lbs.	1243 lbs.	1445 lbs.	525 lbs.	850 lbs.
High speed	142 mph	132 mph	129 mph	165 mph	115 mph
Cruising speed	125 mph	105 mph	100 mph	140 mph	90 mph
Landing speed	57 mph	57 mph	57 mph	56 mph	59 mph
Engine	P-W Hornet	P-W Hornet	P-W Wasp	P-W Wasp	P-W Wasp
Rate of climb (min.)	950 ft.	800 ft.	600 ft.	2,400 ft.	1,000 ft.
Service ceiling	16,000 ft.	15,000 ft.	12,000 ft.	24,000 ft.	12,000 ft.
Take-off run	540 ft.	550 ft.	655 ft.	100 ft.	900 ft.
Cruising range	650 mi.	500 mi.	500 mi.	350 mi.	450 mi.

110 GRADUATES All in Good Positions

Parks Air College has a corps of 54 instructors, eleven buildings with a floor space of 60,000 square feet and a total investment of more than $350,000.00

That is the amazing record established by the Airplane and Engine Mechanics' School of Parks Air College since its first class was graduated in December.





Blazing new trails for other schools to follow, Parks Air College has set a new mark for efficiency in instruction and for service to its students. Every single graduate of the Parks Airplane and Engine Mechanics' School is in a job—and a good one, too.

In one particular airplane factory eighty nine of their valued employes are graduates from the Parks Mechanical School. The remaining 21 graduates are working in different factories over the country, having selected some of the best employment opportunities that come to Parks Airport weekly by wire and by mail.

As a Parks Graduate Your Future Is Assured

A position in an airplane factory is only the start for a man of ambition. After that come the high priced executive positions in transport companies, mail lines, photographic work, mapping, prospecting, as airport managers, and in private flying. *Aircraft mechanics, riggers, inspectors, designers, draftsmen, instrument makers, metal workers, woodworkers,* and many other highly paid men are needed. You can choose the type of work you like best . . and make big money.

PARKS AIR COLLEGE LEADS ALL OTHERS

All Parks Graduates Are Filling Good Positions

Decide now to come to the largest and most completely equipped non-military air college in the world. Here, right at this busy metropolitan airport, you will be trained with the very best equipment. You will work on Whirlwind, Liberty, Caminez, Velie, Hispano-Suiza, OX5, and other famous engines. You will actually build airplanes. The science of *Aerodynamics, complete shop practice, welding, brazing, metal and wood working* in fact, everything that you need to know in order to command a big money job, will be taught you in an easy, interesting way.

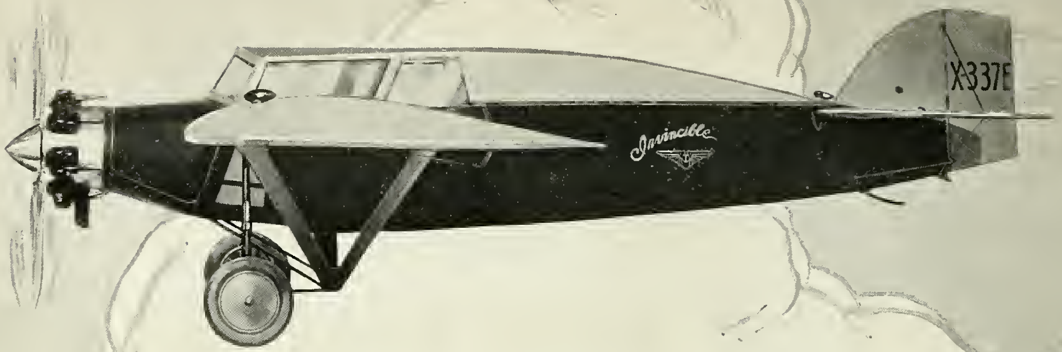
Come to Parks

Aviation executives want the high type men turned out at Parks. The whole story of Parks Air College. the training courses, and student life is fully described in our illustrated booklet. Fill in the coupon now and get your copy by return mail.

PARKS AIR COLLEGE
270-Q Missouri Theatre Bldg., St. Louis, Mo.
Cable Address: PARKSAIR
Member Aeronautical Chamber of Commerce

Name..
Street..
City.............................. State..............

PARKS AIR COLLEGE, Inc.
270-Q Mo. Theatre Bldg., St. Louis, Mo.
Please send me your illustrated book, "THE MAN WHO TUNES THE PLANE" and full information on your special offer.



Perfect BALANCE

Remarkable take-off, flying comfort and landing are a step ahead of the field. Wings of the semi-cantilever type, placed in alignment with the center of the propeller thrust, give perfect balance regardless of the load. Ailerons of the unbalanced type provide exceptional lateral control.

The metal fuselage is covered with specially treated fabric and is finished in beautiful two-toned streamline effect to harmonize with its sleek design. Roomy cabin, comfortable seating and unsurpassed vision in all directions, above and below, add to the joy of flying.

Mechanical perfections are beyond standard requirements. Luxurious appointments and performance under all conditions are outstanding assets to individual ownership and commercial flying. Accessibility to inspection and servicing of motor and control connections simplifies proper flight preparations.

Beauty, rugged strength, advanced engineering and ease in piloting, have placed the Invincible Cabin Monoplane foremost in the consideration of well posted operators. Write for details. Address

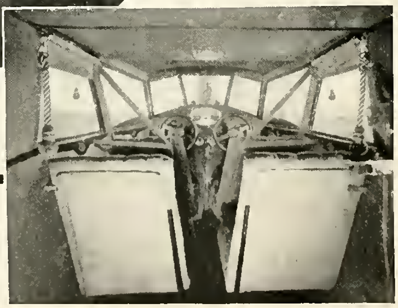
The Aircraft Division of the
INVINCIBLE METAL FURNITURE CO.
Manitowoc, Wisconsin

Invincible
IT'S A BIRD

3 and 4 Place

With a Curtiss Challenger 170 H.P. motor, and four-place capacity, $7800, fly-away Manitowoc. By special ring type motor mount, any motor up to 180 H.P. may be installed to order. Wing span 38′ 8″, length 24′ 9″, height 7′ 3″. Fuel capacity up to 60 gals.

One step of only 21 inches from the ground takes you inside the roomy, colour upholstered cabin.



Dual wheel control, either control detachable. Hinge type throttle for control on either side. Indirectly lighted dash, all instruments centralized.

Building a hangar? Planning an airfield? Facing any airport problem?

A model hangar at Minneapolis on which Robertson materials were used.

Come to

ROBERTSON

LET'S not make any unavoidable mistakes. There is so much yet to be done in this aviation industry . . . so many claims upon every penny of available capital . . . that none of us is justified in repeating experiments that have already failed, or in making mistakes that cost money.

Take hangars, for instance. So many things have already been proven about them that there is no need to make costly experiments. There is no use, for example, to take a chance on unprotected metal roofing or siding for hangars. Do what you will, they will rust away.

There is no use, on the other hand, to sink thousands of dollars into "heavy construction." It costs too much, and moreover it is a dead loss if ever you want to make any changes in your field. For another thing, there is no use ignoring the need for natural daylighting in hangars.

These and hundreds of other problems have been met and solved. The Robertson engineers have participated in all manner of trials and experiments in hangar construction all over the world since before the birth of modern commercial aviation. They know the answers to most of the questions. Let them look over your plans. Their suggestions will cost you nothing and will not obligate you. Just send your blueprints or plans to

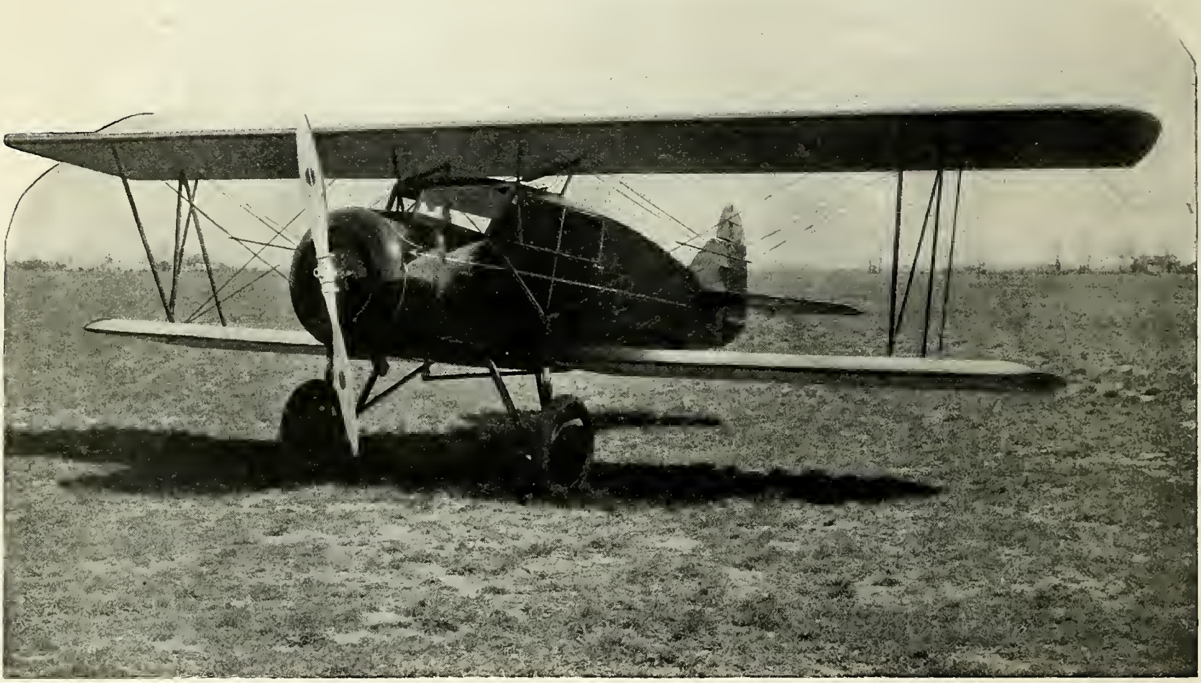
H. H. ROBERTSON CO. · PITTSBURGH

ROBERTSON

WORLD WIDE
BUILDING SERVICE

ROBERTSON *Has the Experience*

Performance
Visibility
Safety
Comfort



CABINAIRE

110 H.P.—*Outperforms the Average 150 H.P. Plane* 165H.P.—*Outperforms the Average 220 H.P. Plane*

—And Why

4-PLACE CABIN BIPLANE

The Cabinaire is 9 ft. high and 23 ft. 9 in. long. The upper wing span is 34 ft. 9 in.;—the lower wing span is 29 ft.

Total wing area (including ailerons) is 308 ft.

Weight empty is 1,352 lbs. Normal pay load of 775 lbs. Carries 42 gallons of gasoline and 4 gallons of oil. Climbs 750 ft. per minute at sea level and has a cruising range of 465 miles.

Cabinaire is available in two types. Type No. 110 has 110 H.P. Warner Scarab Motor, $7200. Type No. 165 has 165 H.P. Wright Whirlwind Motor, $7500. Prices are Flyaway Saginaw. Fully equipped.

Six months ago, competent judges said: "Cabinaire is years ahead of its time." Performance bested its contemporaries, yet, the builders of Cabinaire never took a single detail for granted. In performance, safety and luxurious flying, today's Cabinaire is far ahead of its original achievement. Note particularly the N. A. C. A. cowling which increases its power far beyond the accepted standards of motor ratings. This surplus power in take-off; low fuel consumption; unmatched steadiness in "bumpy air"; smooth landing at extremely low speed fit the needs of operators. The luxurious, roomy cabin accommodates four persons and baggage in comfort. Perfectly balanced fuselage and ingenious wing design provide for greater cruising ability. Aerol struts and Bendix self-energizing waterproof brakes make the Cabinaire as flexible on the runway as it is in the air.

No element of beauty has been sacrificed in attaining this extremely high efficiency; in appointments not a single desire is wanting. Only a flight test by your most discriminating pilot will reveal true Cabinaire flyability.

PARAMOUNT AIRCRAFT CORPORATION
Dept. AF, Saginaw, Michigan

DISTRIBUTORS

Production now enables us to supply distributors on set delivery dates. This represents an opportunity to a few live distributors in unassigned territories. Details will be supplied upon request.

Municipal Airport, for Midwestern city. Layout and design for complete project by Austin Airport Engineers.

Airport Engineering Experience

THE success of your airport project depends to a large extent upon the experience of the engineers who design it. Airport engineering is so new, comparatively, that broad experience in this field is rare although the numbers ot theorists are legion.

With a nation-wide organization of engineers, strategically located in district offices from Coast to Coast, Austin began serving the aviation industry more than a decade ago, and has had a breadth of experience which is probably without equal.

Austin's airport service is unique. It includes site selection and surveys both from the air and the ground, with reports; layout and design of airport with detail engineering plans including runways, hangars, administration, service and other buildings, drainage, lighting, etc. Where construction is handled by Austin, it is covered by definite guarantees in the contract.

Los Angeles Municipal Airport, Boeing Field at Seattle, Omaha Airport—these are typical of many recent Austin projects. Hangars and aircraft factories designed and built by Austin would comprise a list of many of the leading airline operators and airplane manufacturers.

For those interested in site selection, preliminary survey and report, complete airport, hangar or other buildings, airplane or accessory manufacturing plant, it will be well worth while to get in touch with Austin. Phone the nearest office, wire or send the memo.

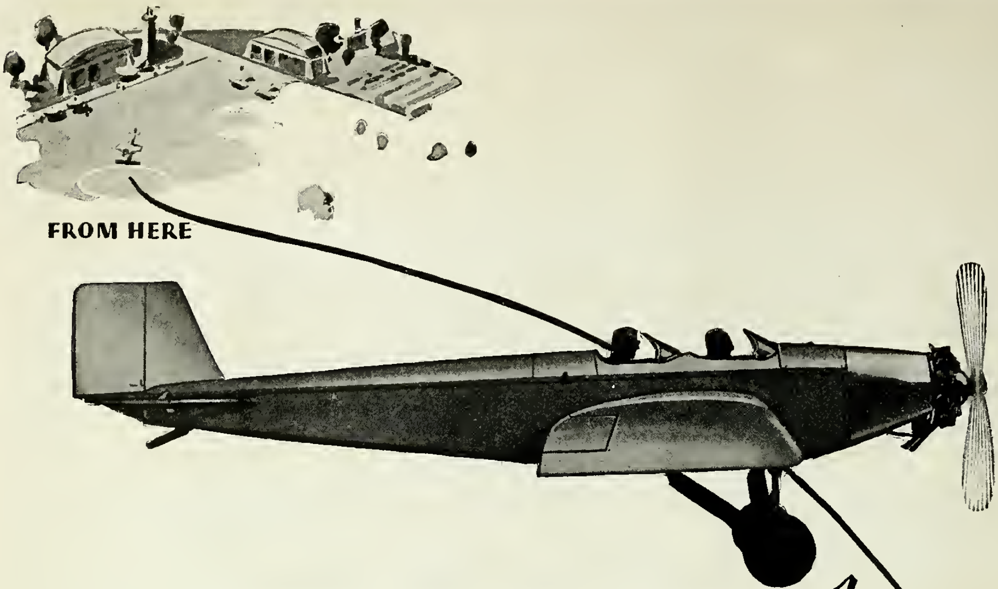
THE AUSTIN COMPANY, *Airport Engineers and Builders*
CLEVELAND
New York Chicago Philadelphia Detroit Cincinnati Pittsburgh St. Louis Seattle
Portland Phoenix The Austin Company of California: Los Angeles, Oakland and San Francisco
The Austin Company of Texas: Dallas The Austin Company of Canada, Limited

AUSTIN

THE AUSTIN METHOD

Memo to THE AUSTIN COMPANY, *Cleveland*— We are interested in
☐ Airport (Municipal) (Private) containing ____________________acres. ☐ Hangar________x_______
with________ft. clearance. ☐ Factory approx.______________sq. ft. ☐ Send me a personal copy of
"Airports and Aviation Buildings." Name____
Position____________________Firm______________________________________City________________
AD 6-29

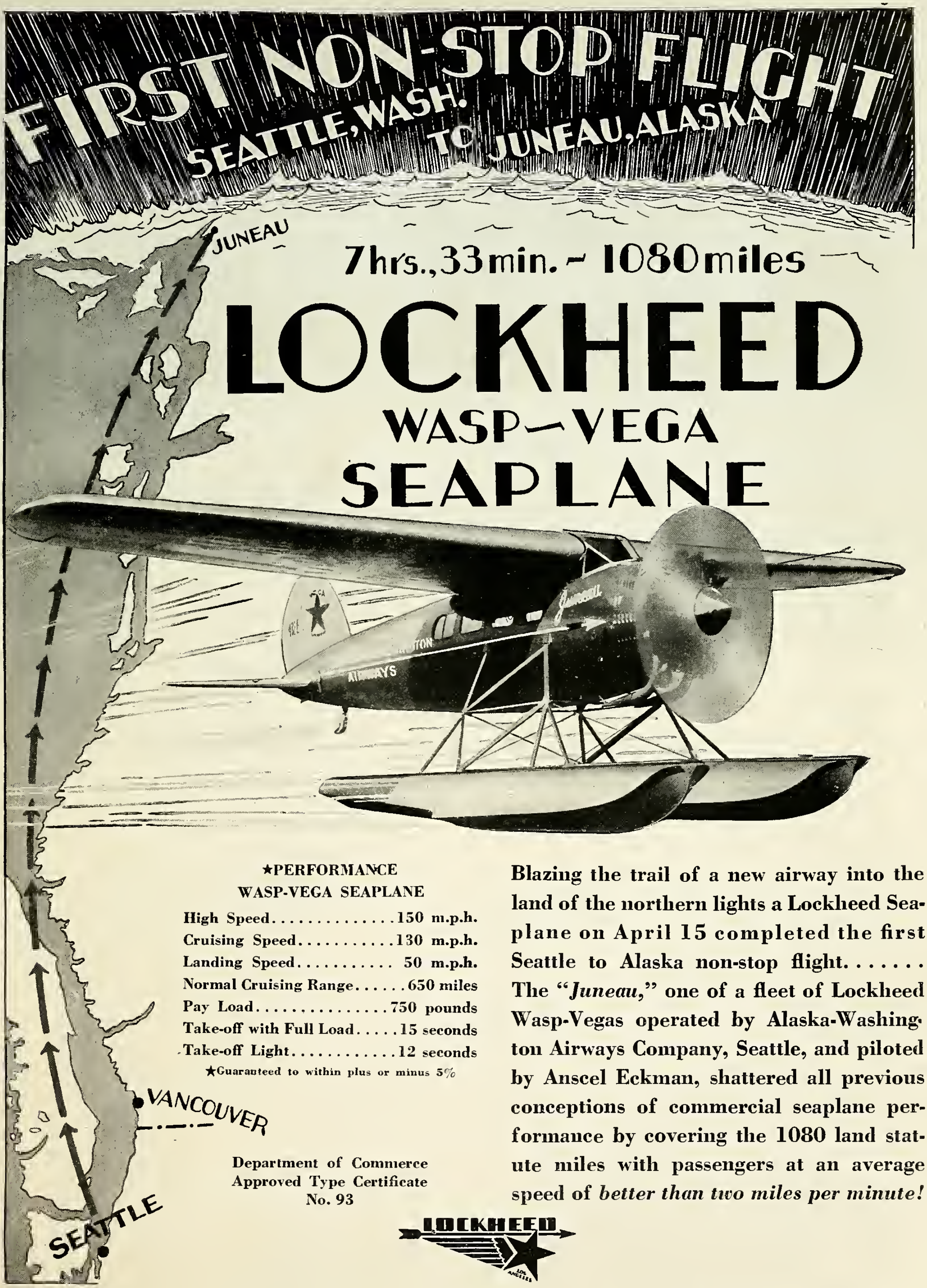
"USE THE AIR SERVICE"
© THE AUSTIN CO



PILOT and passenger in an hour's flight on less than four gallons of fuel—90 miles for $1.80—two cents a mile. *Amazing—and true* of the Aeromarine Klemm AKL25. Designed originally as a glider—powered by its perfectly adapted Salmson 40-50 horse power, nine-cylinder, radial, air-cooled engine—there are sound reasons back of this astounding economy of operation. Although some planes have to be dragged through the air, the AKL25 literally flies itself . . . reducing resistance to a minimum. Private owners will appreciate this, and for the flying school operator the above cost figures mean an actual saving of 30% over the average of standard competition during instruction flights. Add the plane's maneuverability, ease of control and the ruggedness of sound engineering—and you know why the AKL25 is repeating its European popularity—why in America it has become the favorite light plane for private ownership and the training of pilots. The AKL25 bears the Department of Commerce Approved Type Certificate No. 121.

AEROMARINE KLEMM CORPORATION

PARAMOUNT BLDG. 44TH ST. & B'WAY, NEW YORK



7hrs., 33min. – 1080 miles

LOCKHEED

WASP–VEGA SEAPLANE

★PERFORMANCE
WASP-VEGA SEAPLANE

High Speed	150 m.p.h.
Cruising Speed	130 m.p.h.
Landing Speed	50 m.p.h.
Normal Cruising Range	650 miles
Pay Load	750 pounds
Take-off with Full Load	15 seconds
Take-off Light	12 seconds

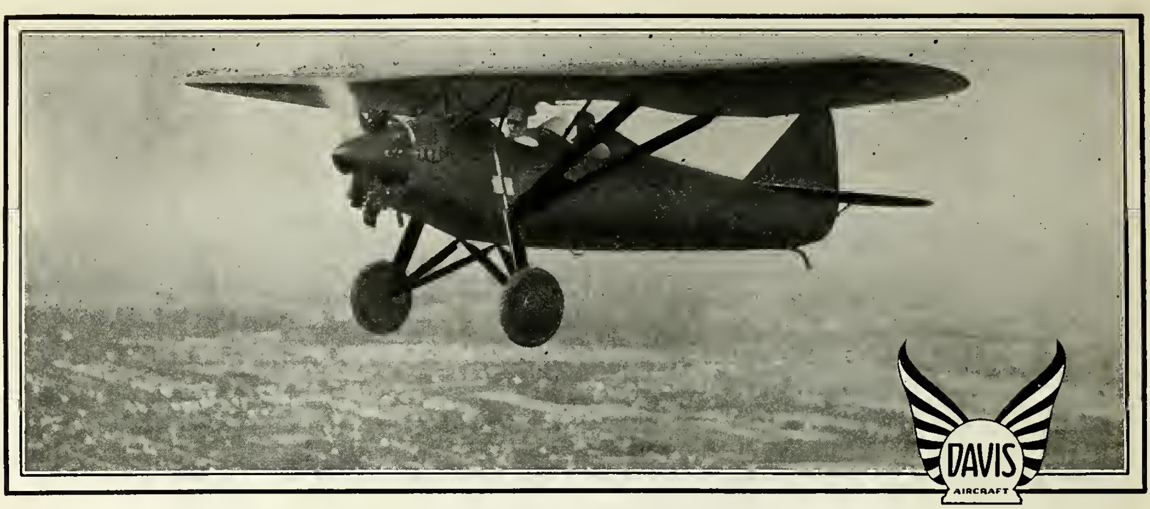
★Guaranteed to within plus or minus 5%

Department of Commerce
Approved Type Certificate
No. 93

Blazing the trail of a new airway into the land of the northern lights a Lockheed Seaplane on April 15 completed the first Seattle to Alaska non-stop flight....... The "*Juneau,*" one of a fleet of Lockheed Wasp-Vegas operated by Alaska-Washington Airways Company, Seattle, and piloted by Anscel Eckman, shattered all previous conceptions of commercial seaplane performance by covering the 1080 land statute miles with passengers at an average speed of *better than two miles per minute!*

LOCKHEED

LOCKHEED AIRCRAFT COMPANY, Los Angeles, U.S.A.



For Student Training

THE Davis V-3 Monoplane merits thorough investigation by every organization planning to buy additional flying equipment for student training.

In the V-3 you will find performance characteristics and stability heretofore limited to larger and heavier planes—with operation and maintenance costs that are extremely low.

The capacity to stand rough handling is built in the Davis. It is all-metal throughout, with the exception of wing spars and fabric covering. Safety factors are in excess of Department of Commerce requirements. Nothing has been left undone in the design or construction of the Davis to give it the utmost in flying qualities—in sturdiness—and in operating economy.

Clear vision, quick takeoff, exceptional stability *in rough weather*, and conservative landing speed all contribute to safety in the hands of the student pilot.

If you are interested in student flying equipment—if, perhaps, you desire a moderate-priced plane for your *own* use, you will be genuinely interested in the complete story of the Davis V-3 Monoplane. Write for it.

PERFORMANCE (ACTUAL)

Service Ceiling	10,000 feet
High Speed	95 M. P. H.
Landing Speed	38 M. P. H.
Cruising Speed	80 M. P. H.
Climb	700 ft. per minute
Fuel Consumption at Cruising Speed	4 1-2 gallons per hour
Cruising Range	350-400 miles

Many rich territories are still open. Responsible dealers are invited to write for complete details of the Davis Franchise.

$2965
Flyaway at field
Complete
with LeBlond 60 H.P.
Radial Engine

DAVIS AIRCRAFT CORPORATION, Richmond, Indiana

V3 DAVIS MONOPLANE

A TWO-PLACE HIGH-WING MONOPLANE—«THE AMERICAN MOTH»

Seymour J. Baum

formerly manager
AIRCRAFT DIVISION BREWSTER & COMPANY

announces

the organizing of

SEYMOUR J. BAUM, INC.

to manufacture

ALL WOOD ▾ ALL METAL ▾ COMPOSITE

FLOTATION GEAR

TANKS *Gas or Oil* • • WOOD *and* METAL PARTS • COWLINGS • COLLECTOR RINGS. • • • • • • ALUMINUM • ALUMINUM ALLOY • • MONEL *and* STAINLESS STEEL PARTS *and* FITTINGS. • • • • • ALUMINUM ALLOY HEAT-TREATING. • • • • • • • • • •

SEYMOUR J. BAUM, *Inc.*
268-288 ALBION ST. ELMHURST, L. I.
Near Queens Boulevard
Telephone Newtown 4420

WACO "165"
STRAIGHT-WING

To meet a widespread demand WACO offers the "165"—a notable combination of a great airplane with a great engine . . . top speed 125 and better . . . remarkably easy on the controls . . . typically "Waco" at getting in and out of small fields . . . and moderately priced.

See it, by all means; you will be impressed. *Fly* it; you will be *sold!*

THE ADVANCE AIRCRAFT COMPANY
TROY, OHIO

WACO
AIRPLANES

"ASK ANY PILOT"

We are preparing a book about the formation of Flying Clubs. If interested, we suggest that you reserve your free copy now.

SPECIFICATIONS

WACO "165" Straight-Wing
J-6 Wright "Whirlwind" Motor
(165 H.P.-5 cyl.)
Wood propeller
Bendix brakes
Navigating equipment
65 gal. gas tank
3-place . . . Dual controls
Customer's choice of colors

$6370

(With metal propeller $275 additional)
Further details on request

THE BERRYLOID FLEET NUMBER FOUR

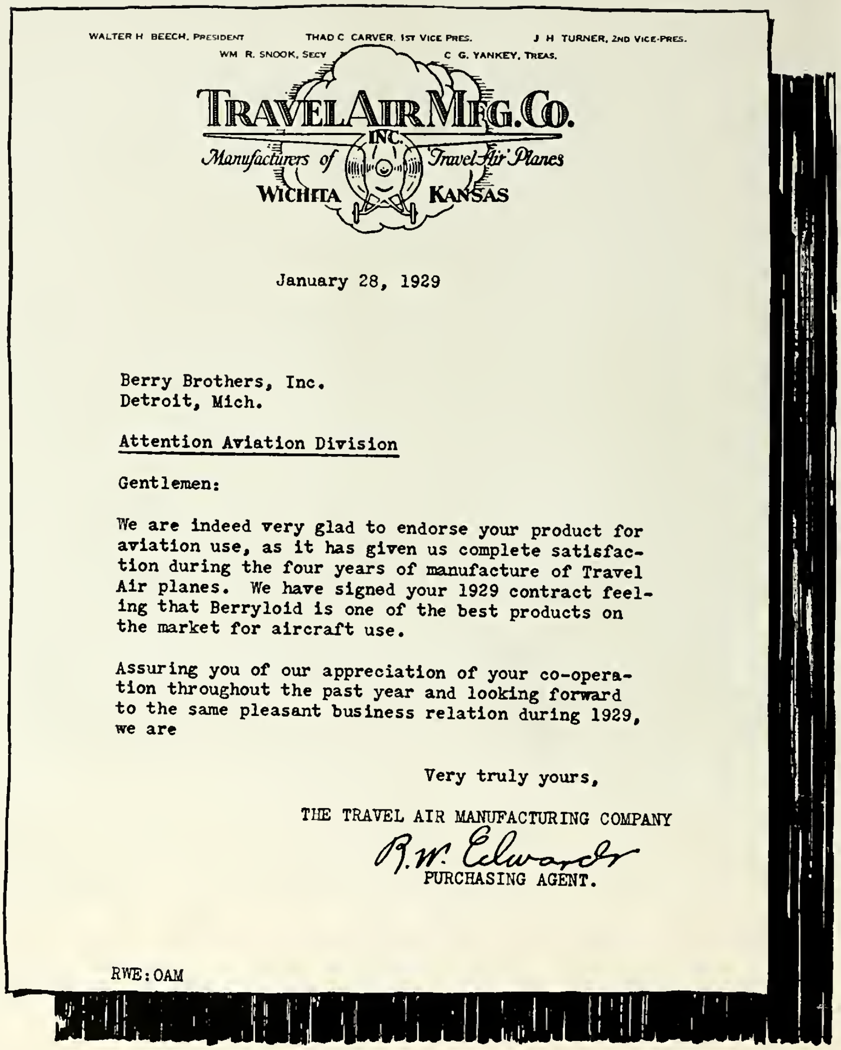
© 1929

Travel Air &
Berryloid
AIRCRAFT FINISHES

International Orange, Travel Air Blue and Vesta Yellow—the colors of the brilliant Macaw, suggested the combination on this Travel Air

MEMBER · AERONAUTICAL · CHAMBER · OF · COMMERCE

TRAVEL AIR *renews* BERRYLOID CONTRACT



WALTER H BEECH, PRESIDENT THAD C CARVER, 1ST VICE PRES. J H TURNER, 2ND VICE-PRES.
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TRAVEL AIR MFG. CO.
INC.
Manufacturers of Travel Air Planes
WICHITA KANSAS

January 28, 1929

Berry Brothers, Inc.
Detroit, Mich.

Attention Aviation Division

Gentlemen:

We are indeed very glad to endorse your product for aviation use, as it has given us complete satisfaction during the four years of manufacture of Travel Air planes. We have signed your 1929 contract feeling that Berryloid is one of the best products on the market for aircraft use.

Assuring you of our appreciation of your co-operation throughout the past year and looking forward to the same pleasant business relation during 1929, we are

Very truly yours,

THE TRAVEL AIR MANUFACTURING COMPANY
R. W. Edwards
PURCHASING AGENT.

RWE:OAM

TRAVEL AIR WAS PRECEDED IN THIS SERIES BY STINSON, FOKKER, AND BUHL.

Many airplane manufacturers contract with Berry Brothers for their entire finishing requirements. Travel Air has renewed its agreement for 1929, expressing complete satisfaction with quality of materials and the service rendered. Every Travel Air, beginning with number one, has been finished from spinner to rudder with Berryloid.

PROGRESSIVE · AIRCRAFT · FINISHES

BERRY BROTHERS INC
Varnishes Enamels and Lacquers
Detroit, Michigan *Walkerville, Ont.*

April 30, 1929.

Mr. I. H. Shearer,
Kendall Refining Company,
Bradford, Pa.

Dear Mr. Shearer:

Needless to say, in my last endurance attempt during which I established a record of 26 hours, 23 minutes, Kendall Penzbest Oil was used. Of course, my opinion of your product has been quite generally known but after a gruelling test such as the above, allow me to state that it has been raised even higher.

The results speak for themselves and the consumption of one-half gallon is exceptionally low, particularly when you consider the heavy load that was carried.

As you know, I have used your oil since I started flying and have every confidence in it and I should like to congratulate you on its merits.

Sincerely,

Elinor Smith

26 hours-23 min.-2 qts. of Oil

Elinor Smith's record-breaking endurance flight over Roosevelt Field in her Bellanca—Whirlwind Cabin Monoplane, on April 23rd and 24th, will be long remembered for the following notable features:

First of all, a plucky 17-year-old girl broke the World's endurance record by 4 hours and 18 minutes.

Secondly, only three other persons—Charles Lindbergh, Martin Jensen and Royal Thomas—have flown solo for more than twenty-four hours.

Thirdly, of the 8½ gallons of Kendall Penzbest Oil with which the flight started, 8 gallons were remaining at the finish—a total oil consumption of only two quarts .... A truly remarkable indication of the value of good lubrication.

World's records in the air are not achieved easily. Exceptional pilots, exceptional planes, exceptional engines and wise planning are all necessary. Pilots plan wisely when they select Kendall Oil for difficult lubricating tasks. Kendall Oil insures effortless engine performance plus conservation of gasoline, for a smoothly running, perfectly lubricated motor is able to deliver the last ounce of power of which it is capable.

Only an oil as good as Kendall can be recommended for faultless performance for thirty hours or more without change. And the oil that stands up longest, lubricates best. Throughout Elinor Smith's flight, Kendall Penzbest Oil performed as it can always be relied upon to do, according to specification. *For a list of Airports where Kendall Penzbest Oil is now obtainable, address Aviation Division, Kendall Refining Co., Bradford, Pa.*

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GRADE OF PENNSYLVANIA CRUDE

Use the Air Mail!

See our Exhibit at the National Aeronautical Exposition, Cleveland, Ohio, August 24th to September 2nd.

HOW BIG? HOW SMALL?

PASSENGER transport flying is so new there is little experience on which to base a decision as to what is the ideal plane capacity. However, here are some facts that bear on the subject:

1. The average passenger load of a railroad car is 14.
2. A high average load in 1927 was 4.5 in transport flying.
3. In 1928 a Pacific Coast operator reported an average load of 6.7.
4. Increasing traffic is reducing fares, and fare reductions are increasing traffic.

It is to be doubted that airplane passenger loads will exceed railroad car loads for some years, at least. Consequently a top figure of 14 passengers is probably the limit of efficient capacity at present.

On the other hand, with loads on the increase, a plane must be able to take care of the gain in average passenger loads brought about by greater acceptance of flying on the part of the public and by the lowered fares now being charged. This indicates that a capacity of 10 passengers is the lowest that makes safe allowance for traffic increase.

In view of these facts we are convinced the Ford tri-motored, all-metal transport monoplane, with its capacity of ten to fourteen passengers, is exactly the right size for present transport operations. The purchase of Ford planes by leading transport companies shows clearly that they agree this to be the efficient and economical transport plane size. Ford planes deserve your consideration for any transport line you are operating or contemplating. Complete information may be obtained by writing direct to The Stout Metal Airplane Company, Division of Ford Motor Company, Dearborn, Michigan.

Features of the Model 4-AT Ford Transport

Price $42,000. *(Standard equipped, fly away Dearborn.) All metal throughout. Exposed surfaces of Alclad alloy. Engines:* 3 *J-6 Wright Whirlwind, total power* 900. *Useful load* 3670 *lbs. Landing speed* 55 *miles per hour; cruising* 107-112; *high speed* 127. *Radius of action* 475-580 *miles; ceiling* 15,000 *ft.* 11 *removable passenger seats; heated cabin; toilet. Complete set of instruments; dual wheel control. Independent brakes; rubber compression shock absorbers.*

Model 4-AT Ford plane purchased by Pennsylvania Air Lines, Inc., of Pittsburgh. Powered by three Wright 300 h-p. Whirlwind engines. Price $42,000.

Volume 14
No. 6

AERO DIGEST

JUNE
1929

THE MAGAZINE OF THE AIR

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Cover Design—Wasp-engined Fairchild type 71 monoplane

AERO DIGEST

Telephone: Wisconsin 3771. **is published monthly by** Cable Address: AERODIG

THE AERONAUTICAL DIGEST PUBLISHING CORP., 220 West 42nd Street, New York City

Frank A. Tichenor, President. A. Horsfall, Vice-President. J. E. Horsfall, Treasurer. K. Healy, Secretary.

George F. McLaughlin, Editor. Robert B. Renfro, Associate Editor. William A. Rogers, Advertising Manager.

Contributing Editors: Dr. Michael Watter, Cy Caldwell, Don Rose, Edgar H. Felix.

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CLEVELAND: 915 Guarantee Bldg. Robert P. Smith, Representative.
KANSAS CITY: 216-217 Pioneer Bldg. J. Hal Miller, Representative. Phone: Victor 1713.
LOS ANGELES: 1129 Mohawk Street. Frank Samuels, Representative. Phone: Dunkirk 6332.

Single Copy 35c. Yearly Subscription $3; Canada $4; Foreign $5.

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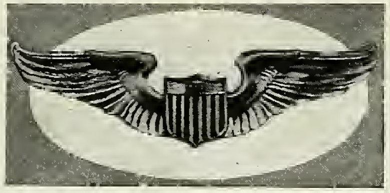
★ *Take-off and Review, Primary Training Class, Brooks Field* ★

LIFE OF A FLYING CADET

By Captain F. I. Eglin

U. S. Army Air Corps, Brooks Field



MARCH 1st. July 1st. November 1st. Suitcases, large and small; "city clothes"; mustaches.

Fifteen minutes later: shaved lips, coveralls, upper-classmen, inspections. Drill, and more drill. Barracks, bunk, and bull. Confusion. "Dodo."

Different types, different accents, different ideas.

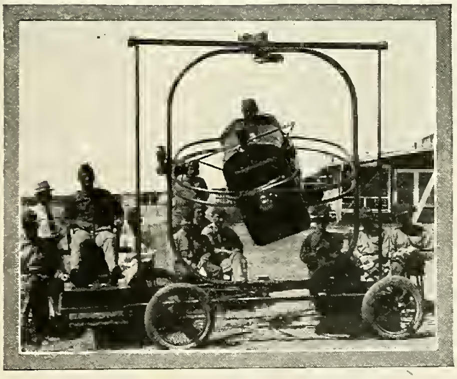
Flying cadets assembled, to enter into an entirely new and troubled existence. Gone, the old life, the office work, the days of leisure and freedom, the nights beneath the summer moon, old friends, old loves. In its place, a life of ceaseless activity, of hurry and work and worry, of feverish excitement. A mad, nervous existence, in which neither love nor leisure nor peace has any place.

Who will forget those first two weeks? Examinations, drill—drill, examinations. The orientator, the "609" the complex coördinator, the psychological, Ruggles pursuit, Schneiders, esophoria. Reaction time, double time, squad right and to the rear. The quarter mile at reveille. Inspections from 6:00 a. m. to 10:00 p. m. One bell after another. No time to wash—never a minute's rest. When you are not drilling, you are standing inspections. When you are not standing inspections, you walk tours. Gigs—more gigs.

Bunk flying, awake or asleep. Incessant chatter. No sleep. Dreams. Getting up before daylight. Confusion, nerves and work—always work.

Drill. Squad east and west. Double time. To the rear. March. Watching the PT's do rolls at a thousand feet. Will you ever fly—or is it just a dream? "ATTENTION." "Pull your shoulders back, Mister Dumbjohn. You are at attention." "What's your name, Mister?" "Do you understand?" "Yes, SIR." There's an upper-classman who must have been a top kick at some disciplinary barracks. Who said this was a flying school, anyway? Or have you enlisted in the Infantry?

Examinations. Three times to the orientator. Innumerable trips to the School of Aviation Medicine. More bunk flying. Blood pressure 130—14 on your "Schneider recheck," on *what?* You put the line of light across the light. If you don't you have hydrophobia. Worry. Grief. Apprehension.



The Ruggles Orientator in action

But finally the two weeks drag to an end, and you draw helmets and goggles. Flying starts on Monday. Could it be true? Would the weather be fair?

Monday finally comes, and you march to "A" Stage for your first hop. The talk by the Stage Commander—will he never stop! Who has ever seen a "T" before? You meet your instructor, adjust your parachute and have your first ride. Fifteen minutes of joy. Fifteen minutes of pleasure. Sunshine and clouds. The sky is blue. One, two, three thousand feet. The hangars are only a marker for the field. The ship levels off. Back comes the throttle and, "Follow me through these banks." The ship banks and turns right, then left. Level again. Again the throttle comes back. You feel the stick being shaken. "You try that." Three thousand feet, and your first time on the controls. You move the stick and rudder cautiously. The plane banks—and slips. Something new—the orientator had not acted that way. You notice that the nose is not swinging as it should. The instructor is patting the side of his helmet. You think a minute. The plane keeps slipping. Oh, yes! You give left rudder. Too much—the plane stops slipping and skids instead. The instructor pats the other side of his head and you take off a little rudder. There! The plane turns correctly at last. After repeating this a few times you wonder if you will ever learn to fly.

But after a while, you seem to be doing better. You start landings. And then, the anxious days before SOLO.

One after another, your classmates solo. Two in one day—one on the next. Occassionally one is checked—anxious hours for him—elimination. You wonder if you will be eliminated too. Then one day, after you have made several good landings, and your turns, spins and forced landings have been fair, the instructor unfastens his safety belt, turns around and asks you for a cigarette. You know what is coming, and you search frantically, wondering if he will change his mind. Finally you find one. Then, "Do you think you can take it around?" Do you! Well ——— ! But all you say is, "Yes, sir." "All right. Go ahead and watch out for the traffic."

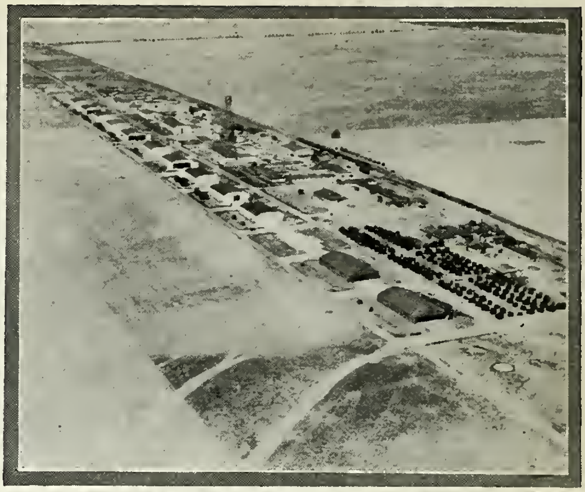
The first solo. Even a bigger kick than the first ride. Half afraid—half confident. You look around carefully; clean your goggles. Your first and maybe your last. You give her the gun and take off. The plane seems so light. The nose is too high or too low. Finally you have it level. You wonder if you can take it around without hitting someone. In fact, where did all the planes come from, anyway? You have never noticed so many in the air at one time before—and all going in the same direction as you wanted to go. First turn—slipped a little and skidded a little but made it. Seems better now. Second turn was not so bad as the first. Now you have to land. Where is your instructor? Cut your motor and start your glide. Too steep. You pull the stick back, hoping that you will not stall. You seem to glide for hours. The ground comes up to meet you. You start to level off, hoping you don't run over your instructor. Where is he, anyway? The tail skid touches, wheels touch. Not three points, but not so bad for an amateur. You're some distance away from your instructor, who is sitting on his parachute in the middle of the field, watching. He motions you to take off again. This time you have more confidence and land nearer him. Solo schedule begins.

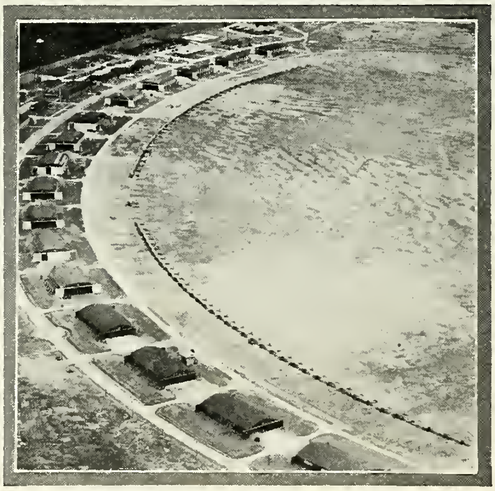
The month of "Dodo Days" drags on. What is this, a game? But the end is in sight. Election of class officers takes place. Recognition day. You speak to upper-classmen instead of saluting them and saying, "May I speak, sir?" What a relief that ceremony turned out to be!

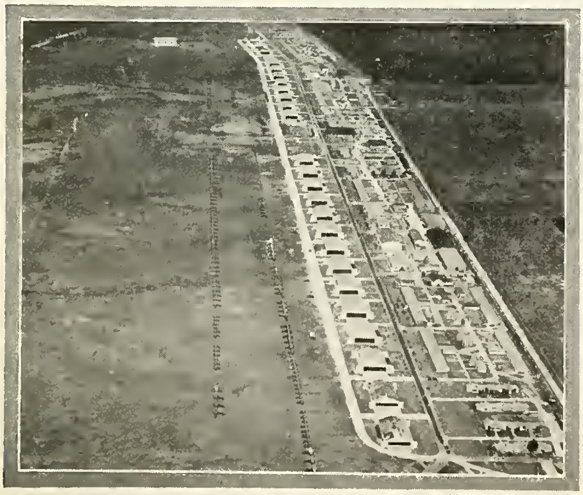
The Cadet Dance. Dates—satisfaction and dissatisfaction. You've almost forgotten how to dance. Introduction—one or two strange-looking females, colorful, if not esthetic. Pretty, some of them. Frantic signals, scouting parties, rescue work. Bed check. Ten demerits and two weeks' restriction to Post. Report to the O. D. hourly on open Post. You see, "it's an old cadet custom."

Holidays. Passes—week-end or for church? You must state *where* you are going. Mexico is forbidden. Rest? Maybe. Anyway, the glory of freedom and leisure for a little while. It seems so long. Won't Sunday evening ever come?

Back again. Take-offs, landings, eights on road, banks, and climbing turns, spins, forced landings and *headwork*. Twenty-hour check. More eliminations. Lost hopes, shattered ambitions. Deadly seriousness again. Who will be the next to go? Time seems to fly by. Things begin to seem more natural to you. More advanced work—chandelles, steep eights, barrels, 180's, 360's, loops and the thirty-five hour check neatly here. Your instructor working frantically on chandelles. Seems that you always fall off, skid or slip. It must stop. Name posted for check. Give up—know you can't pass, but you tried hard. FAILED, but you are to be rechecked later. You and your instructor work. You can now see that both must work in order for you to pass. Never thought of that before. Finally the day comes. Not so good, not so bad. You finish your check. Will it be go on, or go home. The check pilot says nothing. You wonder if you passed, even by a small margin. Minutes seem like hours. You summon up all your courage to ask him, but he speaks first, "On with your next phase work." You've passed! ! ! You feel like you were lucky. You work harder. Only twenty more hours and then the final check in the Primary course. Gee, if that worrysome part of the course was only over!


March Field, Riverside, California


Brooks Field, San Antonio, Texas


Kelly Field, Texas, the advanced training center

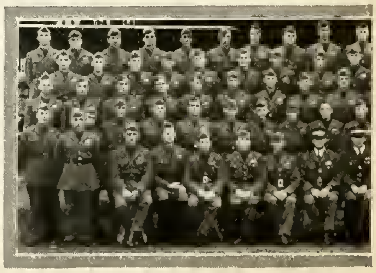
Ground School. No time to think about flying. Early in the morning and late in the afternoons—just to fill up your time before and after flying. Just another thing to keep you out of trouble. Dry, hot—and can't they understand that you came here to learn to fly, that you attended schools and college before you came here. Motors, Navigation, Meteorology, Maps, Rigging and Busser. Useful? Yes, but so dry, especially when you want to fly and fly. Examinations. Re-examinations. Called in, bawled out. Stay in at nights. Study, study is all they think you should do.

One more month and a new class of "dodos" will be here to go through the same bells, to go through the same tests and drills and inspections—to dream the same dreams—and to stand the same gaff.

The fifty-five hour check comes and goes. Only two platoons in the corps now. Formations, night flying, landing at a mark or in a circle, cross-wind take-offs and landing, and then the accuracy stage. It's about over now. The upper class visiting Kelly Field, looking over their new home, their new worries and work.

Graduating Day! Reviews by both classes, speeches, congratulations and the final departure of the upper class.

New flying Cadet Officer appointed. You are appointed the new Flying Cadet captain. Why? No one knows or cares. New responsibilities in addition to your regular work. Don't they understand that you are carrying all that


A group of Air Service Cadets

A formation of twin-motored bombing planes

you can carry? No—at least they don't seem to.

A week's rest before flying? "No." New cadets that you must show the new life to. You make the inspections, ring the bells. Drills, tours and gigs. You are saluted. You bawl out the new men. What do they think this is, anyway? Such dumbjohns you have never seen before! Where did they get them—from the bushes? They will pass the food, pour the water. What are they here for anyway? They can't fly—a waste of time and money. You will be boss and give the commands. They will wear the "Green Tags." There goes one now. "On the double, Mister."

A pursuit squadron of Curtiss Hawks

Flying starts again. You march down the road. Same Stage Commander, same instructor. New idea, this "follow through" system, in which the same instructor goes from the Primary Stage and PT's to "B" Stage and DH's and Basic Course.

New Ships, larger and more powerful. How time does fly! Not like the old days. You wonder if the days seem as long for the new cadets as they were for you. A month goes by. Solo, without the old worry or the old thrill. Same type of work. Harder? Yes, but you know what it is all about now. You understand, you can see and think in the same line as your instructor without talking and without a whole lot of explanation.

Another recognition day. New class not so bad, but it was hard work. They finally saw daylight.

Another dance. Introducing the new cadets to the same girls—the "cadet girls"—that were introduced to you the same way.

Graduating from training camp

The party is over. Same bed check, same scouting parties, same demerits, same tours. "Customs?"

Twenty-hour check coming up. But you are not worried now. You know what they want and you can do even more if they will let you. They don't know that on your solo flights you have tried out several new things. Not allowed—no, but you heard someone talk about it in the barracks, and why not if you are not caught? You are willing to take that chance. Full of confidence now—no more worry. Why do some of the lower classmen look so bad? You guess why, but you didn't look that way when you were just starting. No?

Golf, tennis, volley ball, swimming and more parties. A date once in a while. Why hadn't you thought of this before? More leisure—mind is beginning to function a little more normally again.

More ground school. New subjects—not so hard. You have the swing of the thing now. Buzzer and still more buzzer—the only thing you dislike.

Reveille, drills, inspections and bed check still. Stay out once in a while. Stuff beds—caught and an eight mile hike. Good exercise except for the tired feeling, sore back and blistered feet. Will wait for a while before taking another chance.

Flying? Yes, still flying, but it's different now. No more worries except for the thirty-five hour check. Just like the old checks—not bad, not good. Loud talking, bawling out. Stay in at night. More rest is needed. The check pilot said "slump." What is it? No one knows. What causes it? No one knows. Got it? Yes. New instructor. Take-off for the week-end. See new scenery, new things. Come back feeling great. Begin to improve. Have to be careful now. Too close to the end of the race to stop now. Last phase check—what you expected. Things are easy now. You feel like flying. Make your eights around pylons, slip it into land. Just all in a day's work. Passed, of course. Ready for final check.

(*Continued on page 226*)

Ground "strafing" by Curtiss Falcon attack planes

WEATHER SERVICE AT AIRPORTS

By
Willis Ray Gregg
Senior Meteorologist,
U. S. Weather Bureau

THE relation between weather service and airports is twofold. First, there is the statistical phase in which the records for a period of years are analyzed with a view to determining the most suitable location for an airport, the best layout of runways and the proper orientation of hangars. Decision regarding these matters depends, or should depend so far as practicable, upon the relative frequency of such climatic factors as fog and other causes of poor visibility, winds from different directions, and gustiness as influenced by topography and proximity to high buildings and other obstructions. As a rule there is already sufficient information available, in the local records, for reaching a satisfactory conclusion with respect to these factors and their bearing on the selection of the best possible sites for airports. In some cases, however, it has been found necessary to supplement existing data with an intensive survey of local conditions. Such a survey was carried out at San Francisco and one is now in progress at Washington.

Plotting wind data as observed by means of pilot balloon and theodolite.

But, in the present discussion we are assuming that this phase has been completed, that the airport has been selected, graded, drained, equipped with hangars, and other necessary buildings, and is on an operating basis. We come then to the second phase of the relation between weather service and airports; namely, that concerned with up-to-the-minute reports and short-range forecasts. Let us consider what this service should comprehend, how complete it should be, and how large an area outside of the airport should be included.

So far as this discussion is concerned, airports may be regarded as falling into two classes; 1st, those that form an integral part of a major airways system; 2nd, those that are not on a regular established airway, but from and to which nevertheless there is a considerable amount of flying. The former group is at present the smaller of the two. The time will probably come when it will include a majority of the airports, certainly those of the larger cities.

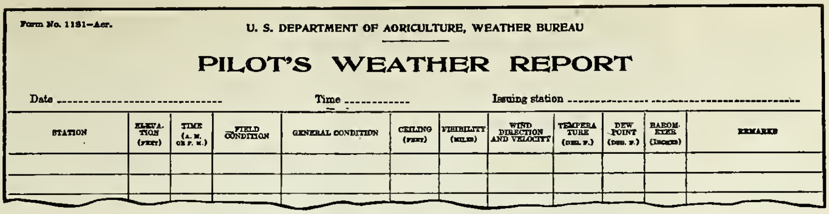
Weather Service Requirements for Airports on Established Airways.

For satisfactory service at major airports on established airways there are four principal requirements, namely: suitable office quarters, competent personnel, adequate instrumental equipment, and prompt and dependable communications arrangements.

Quarters. Naturally, before any service at all satisfactory can be given, a place to work in must be provided. The experience of the past two years indicates that a space of not less than 400 square feet (preferably 800 to 1,000) is needed for properly carrying on an airways weather service. In most cases the Weather Bureau already maintains in the cities themselves a first rate station which provides service for other than airways needs. There are a few exceptions such as that at Greensboro, N. C., which had no weather service prior to that organized at the airport. As an experiment that station has been made to include all type of service and therefore a much larger space was provided. However, for our present purposes we do not need to consider these few special cases, but can devote our attention to the needs for airways service alone. It will probably be found that an airways station at the airport, independent from the city office that serves the general public, although coöperating closely with it, is the best arrangement in most cases.

The space provided for the weather service should be divided into two rooms, the smaller to contain approximately 150 square feet. This is the administrative office. The larger room is the place where the actual service is rendered. Here the reports are received and posted; here the weather maps are made; and it is this place to which the pilot comes to get his bulletin and, when the outlook is uncertain, to talk the situation over with the meteorologist.

These two rooms should of course adjoin. They should be convenient of access to the pilots and operations managers of all the air transport companies regularly using the airport. They should be either in the central administration building or in a separate small building nearby. In general it is believed that the former arrangement is the more satisfactory, but additional experience is necessary before a definite conclusion on this point can be reached.



Form No. 1181—Aer.

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

PILOT'S WEATHER REPORT

Date .... Time .... Issuing station ....

STATION	ELEVATION (FEET)	TIME (A. M. OR P. M.)	FIELD CONDITION	GENERAL CONDITION	CEILING (FEET)	VISIBILITY (MILES)	WIND DIRECTION AND VELOCITY	TEMPERATURE (DEG. F.)	DEW POINT (DEG. F.)	BAROMETER (INCHES)	REMARKS

Top of blank form used to record data for aeronautical use.

In cities that already have a first order Weather Bureau station and in which there is need for an auxiliary station at the airport for airways service, it is held by the Bureau that the Government should not be expected to assume the cost for these additional quarters. On the other hand, it is believed that the free use of these quarters constitutes a very proper share of the city's coöperation in providing the service. It is true that this service is not primarily for the benefit of the airport or the city, but rather forms a link in the chain of aids for the entire airways system. Nevertheless, the airport's importance and prestige are greatly increased thereby; and this fact, if no other, justifies the city in making a definite though comparatively small contribution, and this can be done most easily and effectively by providing the necessary quarters. Almost without exception the cities have not only willingly but enthusiastically agreed to this plan and have carried out their share in an entirely satisfactory way.

Personnel. With quarters provided, the next requirement is personnel. Our conception of what constitutes adequate service has undergone a tremendous change in the course of so short a time as the three years that have passed since the Air Commerce Act became a law. Let us not look to the past except for the lessons that it gives. Let us rather turn our gaze to the future and fashion the service of the present on what we see there.

The airports that we are now considering must function without a pause. Weather service therefore must be organized and maintained on a 24-hour basis. Competent personnel must be selected or developed to provide that service. This is a responsibility that the Weather Bureau, and the Weather Bureau alone, must assume.

Thus far the practice has been followed of selecting and assigning to airport stations some of the more promising young men of the Bureau. Many of these have met the test and are furnishing excellent service. But the demands are increasing all out of proportion to the supply. Moreover, in this field, unlike most others, there is no outside source on which to draw for new material. In commercial life there has, until recently, been no need for the meteorologist. Happily there are signs that this condition of things is changing. Every great demand creates its own supply, and already some of the colleges, notably the Massachusetts Institute of Technology, are organizing courses in meteorology which will within a comparatively short time turn out the type of trained men so badly needed for this new service. And, as its part in the program, the Weather Bureau is planning to take in these men and supplement their educational training with actual experience in subordinate positions before assigning them to positions of leadership.

Observing movements of a pilot balloon.

In the meantime, the Bureau's own men who have grown up in the service and who are demonstrating exceptional ability in this line are being assigned to the most responsible positions. Others, less experienced but showing promise of development, are being placed under these leaders for training. At airport stations having 24-hour service there are required at least four men, preferably five or six, the last number, six, being necessary at such major control points as Cleveland, Omaha, Salt Lake City and others. At stations where night flying is only occasional, a smaller number of men may suffice for a time, but in no case should there be less than two. So far as practicable, a leader is always selected who can not only do the mechanical work of making observations and posting reports but also interpret the data, or, in other words, give the pilots what they most need; namely, short period forecasts. Eventually, and as rapidly as possible, each airport station will have at least three such men, so that there shall be one on duty at all times throughout the day and night.

Instrumental equipment. Having selected the personnel and provided suitable quarters, we come next to the question of proper tools to work with. We can pass without comment the needs for office furniture and take up at once the consideration of what should be included in the way of instrumental equipment. Again we have the benefit of the experience of three years of service for commercial flying, supplemented by that of five or more years of service for the activities of the Government in Air Mail and military flying. That experience has provided us with a very definite picture of the weather elements, a knowledge of which is of most vital concern to pilots. Those elements are:

General condition of sky and weather.

Ceiling.

Visibility.

Wind direction and velocity.

Temperature.

Dewpoint.

Barometric pressure.

Miscellaneous, such as thunderstorms, squalls, condition of field as affected by rain, snow, etc.

Upper winds.

For the general condition of sky and weather no instruments are required, but certain definite terms have become standard for expressing it, such as "clear," "broken clouds," "overcast," "fog."

(*Continued on page 276*)

OPERATION OF THE LONGEST REGULARLY FLOWN AIRLINE

The Boeing System's Five Million Miles of Flying on the Chicago-San Francisco and Seattle-Los Angeles Routes

By Robert B. Renfro

THAT one air transport system has flown five million miles is in itself significant, but five million miles becomes a much more impressive figure when one learns how this system was organized, how it overcame difficulties which were probably not encountered by any other commercial air transport company in the country and how it operated with profit from the start.

When the Post Office Department decided to retire from the operation of the air mail network, its chief problem was to get an operator with sufficient resources to undertake the flying of the longest regularly flown airway in the world, the Chicago-San Francisco-Oakland route of approximately 2,000 miles. Various groups were projected into the picture, but several which planned to bid on the route retired when they realized the outlay required, the flying difficulties which would be encountered and when they fully considered the financial and operating risks confronting them. Previous to that time, the Boeing Airplane Company, which in ten years had outgrown its first one-room factory with thirty employees to become one of the largest airplane factories in the United States devoted exclusively to the manufacture of airplanes, had never operated planes in commercial air transport service. W. E. Boeing and his associates, however, bid on the route and were given the contract.

A Boeing mail-passenger plane flying across the Western mountains.

There were only 150 days between the signing of the contract and the date specified for undertaking the flying of the air mail route. The company put its problem squarely before the material manufacturers and induced them to give Boeing preferential treatment on its requisitions for material. In less than the allotted time, the Boeing Airplane Company had designed and built twenty-five new airplanes, had delivered them along the line ready for service, had flown over the route, and had recruited its flying, ground and traffic personnel. At midnight June 30, 1927, the hour specified, Boeing planes took over the transport of the mail with an efficiency such as might be expected only after long operating experience.

In building its initial fleet of twenty-five mail planes, the Boeing Airplane Company followed an unusual and fianancially daring procedure; all of the ships were built before one was test flown, because the time was too short to build one plane, fly it, and then build the balance of the fleet. Yet despite the rapid and constant changes in aeronautical engineering and design, the Boeing combination mail-passenger planes built at that time are still performing so efficiently that the factory is even now producing many of them for service on several air mail lines other than the Boeing system.

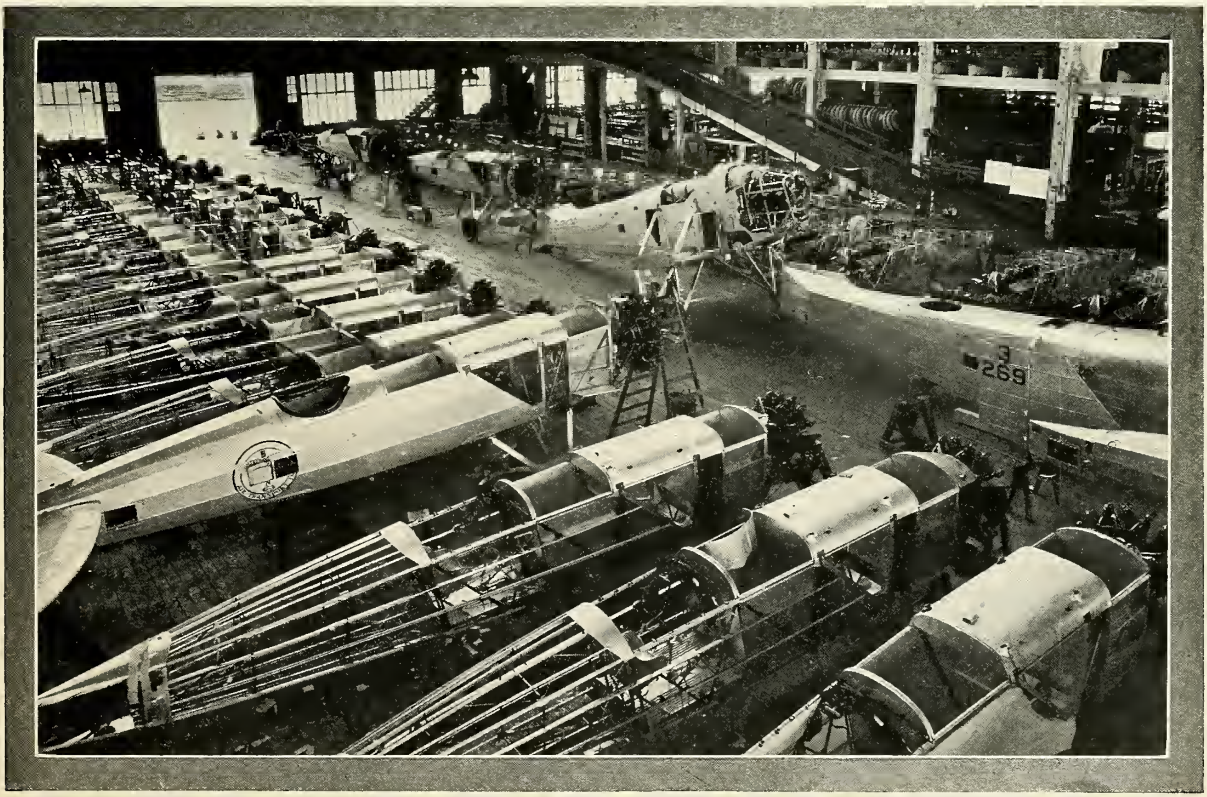
The flight of five million miles is a narrative of solving problems as fast as they developed. The transportation of eighty-five million letters, thousands of express shipments, and nearly six thousand passengers between the Great Lakes and San Francisco Bay and over the Los Angeles-Seattle route, which spans practically the entire distance between the United States and Canada on the Pacific seaboard, has entailed difficulties which could be surmounted only with unusual perseverance and efficiency. The San Francisco-Chicago route, for example, presents wider extremes of conditions than any airline in the world. The altitudes of the various landing fields vary from sea level to approximately 6,400 feet. Part of the route is flown over flat prairie country, the other part is over mountain ranges that force the planes sometimes as high as 15,000 feet. Ground temperatures in the summer may run as high as 130 degrees, and in the winter they may drop as low as 45 degrees below zero. This wide range of climatic and altitudinal conditions necessitated providing an airplane that could carry the required loads successfully over all portions of the route and still have speed sufficient to meet the schedule, even under adverse weather and wind conditions.

C. K. Vance, veteran mail pilot, about to take off on a flight over the Sierra Nevada Mountains.

Eastbound out of San Francisco, the short trip to Sacramento can be made at any altitude, depending upon atmospheric conditions. Within 100 miles east of Sacramento, the ship must clear a minimum altitude of 8,000 feet, which is the elevation of the pass in the Sierra Nevada Mountains. If this pass is obstructed by clouds, it is necessary to ascend to an altitude of 13,000 feet, or even to 15,000 feet, to be certain of clearing the peaks of the range. On the other side of this range, the airplane drops into Reno, Nevada, at an altitude of 4,500 feet. The next stop is Elko, Nevada, at an elevation of 5,060 feet. Between these two places are ranges of mountains with maximum elevations of 8,000 to 10,000 feet, although by following the passes, the pilot can safely fly at an altitude of 7,000 or 8,000 feet. East from Elko, there are a few ranges, after which the line crosses Salt Lake Desert and enters Salt Lake City at an elevation of 4,400 feet. Three other lines also operate into Salt Lake City; i. e., the Western Air Express from Los Angeles, the Varney line from Pasco, Wash., serving the Northwest, and National Parks Airways, serving Idaho and Montana.

The load carried out of Salt Lake City is usually quite heavy. It is exceeded only by that flown eastward out of Cheyenne, which is ordinarily a few pounds greater. This estimation of loads includes air mail and express only. Passengers and baggage normally add 300 or 400 additional pounds. Taking off at the altitude of 4,400 feet, the plane must attain an altitude of 10,000 feet in a distance of about 40 miles in order to clear the Wasatch Range. The next stop, Rock Springs, Wyo., is at an altitude of 6,400 feet and is the highest regular stop. The emergency field at Rawlins, Wyo., is higher, being at an elevation of approximately 8,000 feet. Leaving Rock Springs, the pilot must fly at about 7,000 or 8,000 feet until within 100 miles of Cheyenne, Wyo., when it is necessary to ascend to 10,000 feet to clear the Laramie Mountains at Sherman Pass. Cheyenne lines at an altitude of 6,200 feet. From Cheyenne eastward, the route is over country that is substantially flat, the elevation decreasing to 2,800 feet at North Platte, Nebr., 1,100 feet at Omaha, 660 feet at Iowa City, and 600 feet at Chicago.

This description of the route serves to reveal more vividly the conditions confronting the Boeing operations department from the beginning. (*Continued on page* 250)


Factory of the Boeing Airplane Company in Seattle, where the company builds mail, passenger and military ships.

CONGRESS LEGISLATES FOR THE SKY

By Dudley Cammet Lunt

THE scene is Roosevelt Field. It is before dawn and rain drizzles dismally. A small crowd huddles in groups about a mound. Here in dim outline stretch the wings and tail of a large monoplane. The engine flutters and then roars. Spurts of flame shoot from the exhausts. The ship creeps forward and lumbers down the long ramp. On and on it rolls over the sodden field. The take-off is interminable. In the distance stretches a line of telephone wires. Watchers hold their breath. Will he clear them? The ship is off the ground. It climbs imperceptibly. The pilot fairly wishes it over the wires. In a moment the ship merges with the obscurity of distance.

A day follows filled with wild rumors and conflicting reports. Radios hum. Headlines blare. The while a lone plane with a lone pilot wings over the great circle through "snow and rain and heat and gloom of night." Dusk has fallen when they swoop down at Le Bourget. From dawn to dusk a man and his ship have winged from America to Europe and from obscurity to eminence. In the next few weeks there are receptions medals, speeches, crowds and publicity galore. Belgium, England and these United States are visited in a series of flights. The entering edge of flight has pierced the public mind.

These events dovetailed into a legal structure. At that time there was in existence comprehensive legislation on the subject of air commerce. This was the Air Commerce Act of 1926. This enactment has formed a background of unified control, regulation and encouragement for the aeronautical activity that has increased apace since Colonel Lindbergh's flights. Today its beneficent provisions are practically unknown to the public. True there had been other legislation but it had been confined to particular situations. The war gave rise to statutes governing military aircraft and operations. Thereafter came the period when the air mail was developed. With respect to such matters, Congress was expressly empowered by the Constitution to pass legislation. When the question of commercial aeronautics came to be finally considered, different and more involved problems were presented.

In a case decided by the Supreme Court in 1877, Chief Justice Waite used the following language:

"Since the case of Gibbons vs Ogden, it has never been doubted that commercial intercourse is an element of commerce within the regulating power of Congress. . . . Both commerce and the postal service are placed within the power of Congress, because being national in their operation, they should be under the protecting care of the national government.

"The powers thus granted are not confined to the instrumentalities of commerce, or the postal service known or in use when the Constitution was adopted, but they keep pace with the progress of the country, and adapt themselves to the new developments of time and circumstances. They extend from the horse with its rider to the stage-coach, from the sailing vessel to the steamboat, from the coach and the steamboat to the railroad and from the railroad to the telegraph, as these new agencies are successively brought into use to meet the demands of increasing population and wealth."

It was on May 20, 1926, that Congress took the initial step with respect to aeronautics and passed the Air Commerce Act. This was the culmination of much theoretical discussion. Learned jurists had debated the problem as to whether each country owned absolutely the air-space above its territory. There was the problem of the source of Federal authority. Some had advocated the admirality, others the war powers. The treaty-making powers were urged and eminent domain. Some threw up their hands and said an amendment to the Constitution was the only satisfactory source of power.

The Act sets these problems at rest. The source of Congress' power to legislate is conceived to be in the Commerce Clause—"The Congress shall have Power . . . to regulate Commerce with foreign Nations, and among the several States. . . ." The statute is confined by express terms to aircraft employed in interstate or foreign commerce. This should be kept constantly in mind. The question as to the sovereignity of the air is settled by the declaration that it is vested in the Government of the United States. It is also provided that the navigable air-space, which means air-space above the minimum altitude for flight prescribed by the Secretary of Commerce, shall be subject to a public right of freedom of interstate and foreign air navigation. Thus is delineated the scope of Federal authority.

The purpose of the Act is to *encourage* and *regulate* the use of aircraft in commerce. Apart from the provisions already mentioned, the bulk of the statute is devoted to these ends. Its effect is so far-reaching and so vital to the traveling public, that its general outline should be popularly known. Its comprehensive scope is clearly apparent from the definition of aircraft applicable throughout:

"The term 'aircraft' means any contrivance now known or hereafter invented, used, or designed for navigation of, or flight in the air, except a parachute or other contrivance designed for such navigation but used primarily as safety equipment."

The enforcement of its provisions is added in large part to the duties of the Secretary of Commerce. The office of an additional Secretary is created to assist him. With respect to the problem of regulation the framers of the Act effected a skilful piece of draughtmanship. Regulation is covered under four main heads:

1. The registration, rating and re-rating of aircraft and the issuance of aircraft certificates.
2. The examination and rating of airmen and the issuance of airman certificates.
3. Examination and rating of air navigation facilities.
4. The establishment of air traffic rules.

In the first place any citizen (which term includes partnerships and corporations) of the United States, owning an aircraft that has not been registered under the laws of any foreign country *may* request that it be registered as "an aircraft of the United States." Furthermore, before granting such registration, the Secretary of Commerce *may* require as a basis for rating the aircraft as to its airworthiness:

1. Particulars as to its design or construction or
2. The reports of qualified persons employed by manufacturers or owners of aircraft, or
3. The periodic examination of aircraft in service and reports upon such examination by officers or employees of the Department of Commerce, or by properly qualified private persons.

Such aircraft may be re-rated from time to time. There

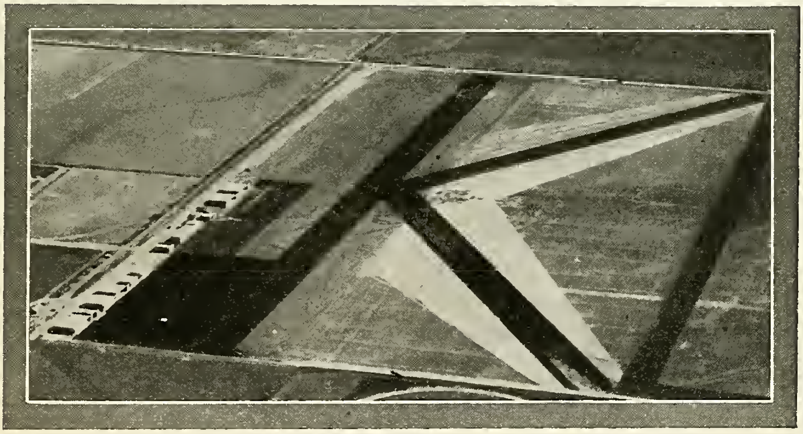
(*Continued on page* 256)

Dormitory No. 1 (right) and Mess Hall (left) at the Hancock Foundation College of Aeronautics, Santa Maria, California.

HANCOCK FOUNDATION COLLEGE OF AERONAUTICS

WHEN on May 1, 1929, the first classes began at the Hancock Foundation College of Aeronautics, near Santa Maria, California, the aviation industry was introduced to a new and unique idea in aeronautic training. This institution is perhaps the most notable departure from conventional practice that has recently been undertaken in this particular phase of aeronautics. Unlike the strictly commercial school, its plan of operation includes definite schedules of daily routine such as are found in secondary academies and military schools. Since the enrollment is at present limited, students are selected on the basis of their physical and educational qualifications. Unless the applicant intends to confine himself to ground work alone, he must be a graduate of a high school or have had instruction equivalent thereto. Exceptions to this rule, however, may be made in meritorious cases. A knowledge of mathematics, including algebra, geometry and elementary physics, is nevertheless essential for admission to the college.

The college was founded by G. Allan Hancock as a non-profit corporation. Its purpose is to provide for students a complete and modern training in all branches of aeronautics at the lowest possible tuition fee. The articles of incorporation state that "the charge to each student for tuition fees, service and facilities shall be fixed at the lowest practical figure, and in no case shall the same be collected in an amount which will return to the college the cost of instruction, service and facilities offered to such student." Certain accommodations are offered without charge; for instance, the college furnishes all text books, and pays doctors' bills for the treatment of sickness and for minor surgery. On entering the school, each student pays a small security fee to cover damages he may incur to tools, equipment or property of the college. All or part of this money is returned to him at the conclusion of his courses if he has not occasioned damages to that amount.



An aerial view of Santa Maria Airport, site of the Hancock College.

The courses are divided into three general classifications, technical, flying and mechanical. The courses coming within this classification are denominated: A—flying course, B—navigation course, C—meteorology course, D—airplane mechanics course, E—engine course, F—aerial mapping and survey, and G—parachutes. The flying student receives instruction in all of these subjects, with the exception of the aerial mapping course which is offered only when there is sufficient demand. Moreover, the flying student receives two hours instruction in blind flying without additional charge. The primary flying course includes twenty hours dual instruction and ten hours solo flying. Single-engined and tri-motored cabin ships are provided for those who wish to take the limited commercial and transport pilot courses, respectively.

The college is located at the Santa Maria Airport, within a mile of the center of the city bearing that name, in Santa Barbara County, California. (*Continued on page* 248)

Buildings at Santa Maria Airport with the college flying equipment lined up in front of hangars.

Amelia Earhart flying a glider

GROWTH OF THE GLIDER MOVEMENT

By
Donald F. Walker

Manager of the
National Glider Association

A typical soaring glider in flight

SLOWLY but consistently the national glider movement is getting under way in the United States. Historically, gliding is older than motored flying, both in the United States and elsewhere. Toward the close of the last century, the pioneers of aviation were trying to conquer the problem of flight by the use of motorless planes. They were motorless then because there were no suitable motors. But for the invention of a gasoline motor adapted to aircraft use, the development of motorless flying might have come much sooner. That is precisely what happened in Germany when, under the Treaty of Versailles, that nation was deprived of the use of airplane engines and gliding began to be practiced on an extensive scale.

One of the first successful experimenters was Otto Lilenthal, who constructed a most interesting "hang glider" in the early nineties. A few years later, the Wright brothers successfully flew a motorless plane before bringing out their first power-driven ship. Moreover, they subsequently did more experimental work in a glider, which resulted in their establishing an official American gliding record of slightly more than ten minutes. These soaring flights have gone almost unnoticed because of the apparent greater interest in the development of the powered airplane. Chanute at Chicago also successfully flew a glider in the early days. Many reports are now coming in concerning other experiments, some successful, more not so.

In 1919, German war pilots returned home enthusiastic about flying but barred from the use of motors. Determined to keep their hands "on the stick," they organized a society for the renewal of interest in motorless flight which has developed into the great Rhoen-Rossitten society. Aviation enthusiasts of all classes joined in the sport. The government rendered such aid as was possible. The German equivalent of the United States Weather Bureau made many valuable contributions to the knowledge of air currents and meteorology, and received many in return. The universities, which had many war pilots among their instructors in aeronautical engineering, became enthusiastic centers of development and eventually took the lead in introducing great successful soarers, the daring designs of which could only have originated in the minds of youth. Manufacturers lent their aid; Anthony Fokker, for example, having built the first successful two-seater glider.

Progress continued to such an extent that, in 1928, gliders were flown cross country for over forty miles, stayed in the air for over fourteen hours and established an altitude record of 2,500 feet. (The latter was recently superseded by a new record of over 6,800 feet, established by Krönfeldt.) In 1928, Kegel startled observers by flying directly into a storm cloud and proving the feasibility of using the upcurrents of air under the leading edge. Later, Nehring experimented for months on "cloud hopping" with a light powered plane, the results having been published for the perusal of glider pilots. This resulted in raising the average soaring flight altitude from 800 feet to 1,300 feet.

This was the situation early in 1928 when the first earnest efforts were made to introduce modern gliding and soaring into the United States. Years before, students of Massachusetts Institute of Technology had become interested in gliding, had built gliders and had sent a glider team to Germany and France. In the summer of 1928, the American Motorless Aviation Club of New York, with J. C. Penney, Jr., as president and financial backer, had brought to America Captain Paul Franz Rhoere, head of the great Rossitten school in Germany, two companions and several ships. In August, Pilot Peter Hesselbach, who holds world records for two-seater gliders, flew for over four hours on Cape Cod. This flight stimulated a great deal of favorable interest in this country. At that time, Frank Blunk, aid to Mr. Penney, won his third class glider license from Captain Rhoere in the name of the Rhoen-Rossitten society. Later, during the winter, Philip Allen, of Boston, went to Rossitten and won his first class license.

Early in 1928, Edward S. Evans, chairman of the aircraft bureau of the Detroit Board of Commerce and a pioneer in American commercial aviation ventures, pointed out to the Board of Commerce the importance of America becoming interested in gliding and deriving the great benefits which Germany had proved existed in motorless flight as a sport, as a method of training aircraft pilots, and as a method of experimentation in the relations of meteorology to aviation and in the testing of new types of aircraft designs without the interference of propeller slipstream. Later, Mr. Evans agreed to finance the organization of an assoication of national scope devoted to the development of motorless flight in America. When first organized this undertaking was called the Evans Glider Clubs of America but on January 1, 1929, the name was changed to the National Glider Association.

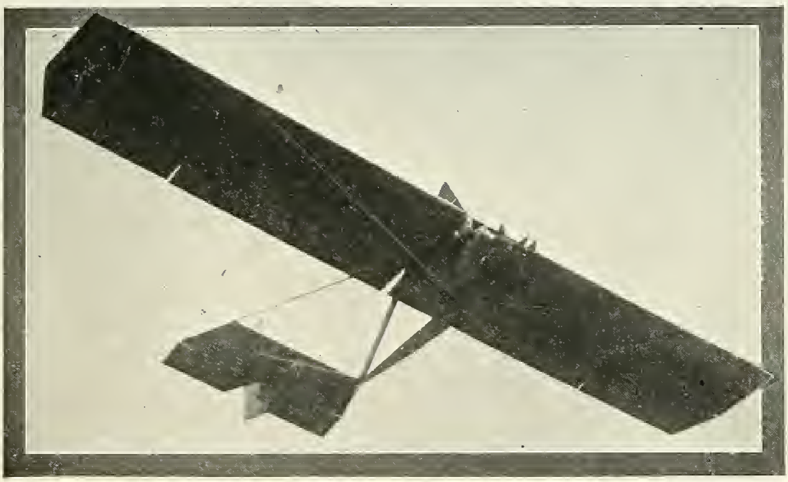
There were many handicaps to be overcome. Perhaps the principal obstacle was the general ignorance of the subject which prevailed not only all over the country, but in the offices of the new association itself. In order to surmount these difficulties, Mr. Evans sent his sons to Germany to visit the Wasserkuppe, where they made many valuable contacts and secured a great deal of valuable information, some verbally but more in pamphlet form. When translated, this information was used in the educational campaign which the association conducted with aid of aeronautical magazines and 800 daily newspapers. To further increase knowledge of the subject, the staff studied special courses in aerodynamics to aid in fitting them for their new duties.

Another problem was that of providing proper equipment and training for those who wished to engage in the

P. & A. Photo

Miss Maxine Dunlap, glider pilot

sport. Unfortunately a popular misconception of gliding had arisen and had to be overcome. The association received many letters from twelve-year-old boys who had met with success in building and flying models, requesting blue-prints of the great German Darmstadt soarer. This seems almost ludicrous when one considers the fact that this plane is so complicated that the German engineer, Dr. Paul Laubenthal, who accompanied Captain Rhoere to American last summer, could not repair it after a "wash-out" without detailed blue-prints from Germany. The fact which many persons failed to accept is that a glider is an airplane less the motor, that it requires great structural precision, and that amateurs should not attempt to construct one. The misconception in this country was aggravated by the use of the word "high school" in speaking of Darmstadt and other schools where soarers had been developed and flown in Germany. Many Americans failed to understand that a German "high school" is far more advanced than a high school in the United States. In this case the term applied to a school for graduate aeronautical engineers.


P. & A. Photo

Miss Dunlap of Oakland, California, flying a primary training glider

Plans of the German *zoegling* which corresponds to the American primary training glider were secured and translated into English. In general these plans, however, were unsatisfactory, although several clubs enjoying the services of aerodynamical engineers did succeed in building satisfactory training ships by using these plans merely as a general guide and working out the details for themselves.

Recently, these plans have been completely worked over by the technical committee under the chairmanship of Dr. Wolfgang Klemperer, of the Goodyear Zeppelin Company, of Akron, and will shortly be available to those members of the National Glider Association who have had experience in the design and construction of aircraft. A small charge for the plans is made to members to cover the cost of their revision.

Last October, Gliders, Inc., of Orion, Mich., was organized to build gliders for sale to the public. There is no connection between this firm and the association, although many member clubs are securing their equipment from Gliders, Inc. The Northwest Aircraft and Motors Company of Seattle is also producing gliders, being represented in the East by E. W. Sawyer of Detroit. Other concerns have announced that they are building test jobs. Today any club with the trained personnel needed to build a glider can do so, and if the club has not such personnel or if it does not care to go to the real trouble involved in building a glider (and even for experienced aircraft people, the building of a first glider is plenty of grief), it should have no trouble buying its equipment from the manufacturers at exceedingly moderate prices.

Another serious problem facing the association was the training of glider pilots. Simple gliding consists of being launched into the air by a shock cord or light automobile and then sliding down hill on the air just as a sled slides down hill on the snow. In other words, once in the air, the glider makes a dead stick landing.

It has been found, however, that the instructions which the association has prepared in written form, can be studied by a motored pilot and used in making successful flights. After he has had some experience on a glider this pilot ought to be able to instruct others without any training. The college clubs are also beginning to turn out trained glider pilots who, when they return to their respective homes for vacations, can act as instructors for local clubs. Although special training in soaring is recommended as saving time in the advanced training of glider pilots, those who have made several flights on proper terrain usually begin early to utilize the rising currents of air to prolong simple gliding flights and automatically acquire a knowledge of their utilization which eventually results in their being able to make, first simple, and then complicated soaring fields. However for record work, such an extensive knowledge of meteorology is required that all pilots with ambitions for world records should arrange to take special training for the purpose.

Gliding has been introduced into the Embry-Riddle flying school at Cincinnati and probably will sooner or later be found in most aeronautical training institutions. According to present plans, there will be special schools for record work where research studies in meteorology and its relations in flight, in wing design, etc., may be developed in a manner similar to the institutes on the Wasserkuppe and at Rossitten in Germany.

The choice of terrain is another problem. Three forms of terrain can be used in gliding. A certain elementary gliding can be done from a level field. Test pilots of Gliders, Inc., have devised a new method of launching by shock-cord on such a field. The shock-cord sends the glider on a

(*Continued on page 224*)

THE ARMY AIR CORPS MANEUVERS

By
George Gardner

IT was just a war in Ohio as far as the other armed forces were concerned, but for the men of the Army Air Corps and for everyone directly or indirectly interested in aeronautics, it was an occasion of much larger significance, and great rejoicing.

In the late tactical and theoretical unpleasantness in the Middle West, the airplane demonstrated anew that in the matter of warfare it is a weapon capable of enlarging almost indefinitely the sphere of combatant activities, and while small land forces were struggling uphill and down dale and never getting very far beyond the borders of a state or two, the 200 military planes concentrated for the war games, which were held from May 15 to May 25, were able to carry on their operations over a much larger territory and in one spectacular incident to thrust a warlike arm over the Alleghanies to give the people on the eastern slope, and particularly in New York, a taste of the belligerent activities.

Although there seems to be good enough grounds for believing that the Middle West war games were not made up altogether by the professional warriors for demonstrating the present position of the military plane in the list of man's weapons for destruction, there was, before the battles were over, sufficient activity on the part of the military fliers to put across this general idea. And although he would be a rash prophet who would predict just what rewards the Air Corps will receive in future governmental considerations for its extraordinarily fine display, there were a sufficient number of prominent figures from Washington present as observers of the games to belie anything but prejudicial blindness in the future.

Major General Bennie E. Nolan, regularly in command of the 5th Corps Area, was the generalissimo of the war. Brigadier General Benjamin D. Foulois, Assistant Chief of the Air Corps, was in charge of all the flying operations, and all of those competent to judge have agreed that the fliers in his command were the boys who put over the war and acquitted themselves in splendid fashion.

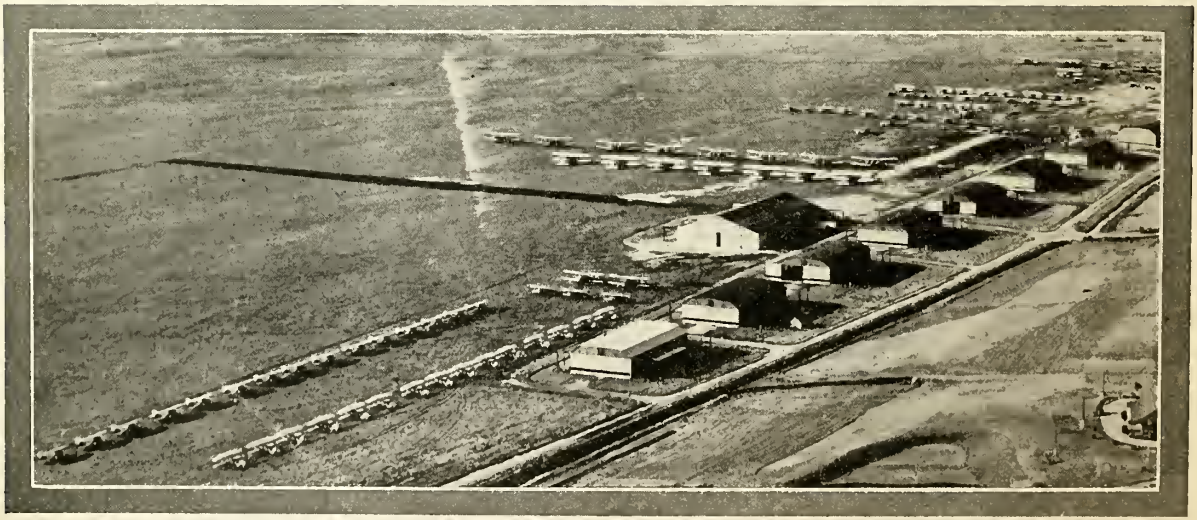
The plan of the theoretical hostilities contemplated a state of war between two states; Blue, west, and Red, east, on a general north and south line running two miles west of Toledo, Bowling Green, Washington Court House and Millsboro, all in Ohio.

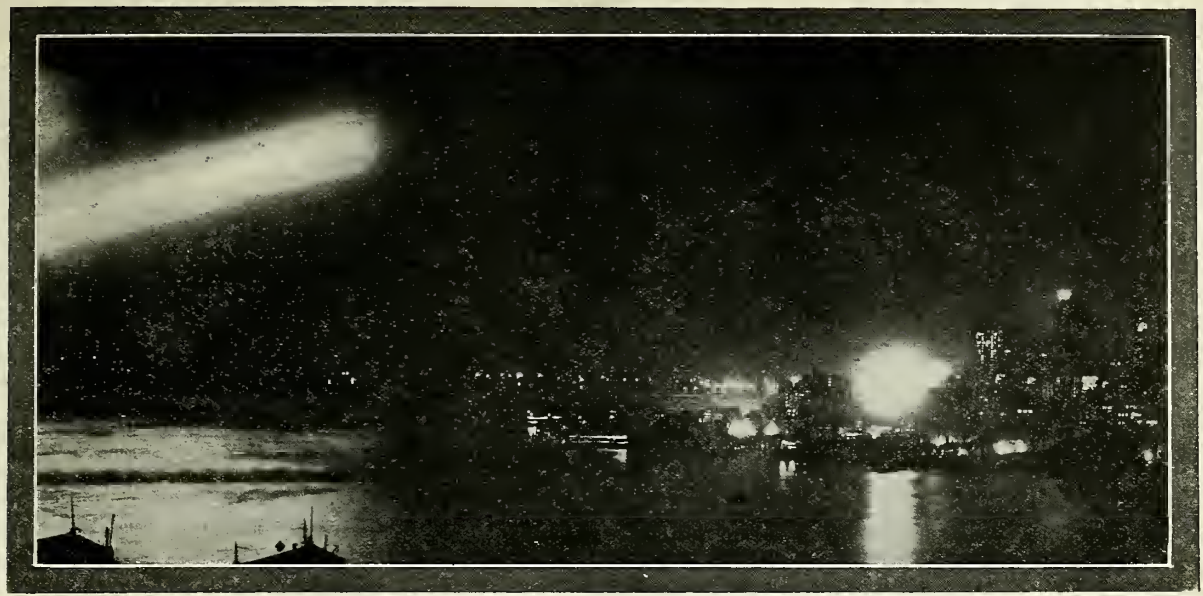
The Blue air forces were concentrated at Wright Field, Dayton, Ohio, and the Red air forces at North Field, Columbus. The Blue air forces consisted of the 2nd Bombardment Group, 18 planes; 3d Attack Group, 34 planes; 95th Pursuit Squadron, 15 planes, and the 9th Observation Group, 15 planes. The Red Air Corps consisted of the 11th Bombardment Squadron, 6 planes; 1st Pursuit Group, 50 planes; 15th Observation Squadron, 9 planes; and the 16th Observation Squadron, 9 planes.

The "zero hour" came at midnight Wednesday, May 15, but the first actual clash between the opposing air forces did not occur until May 17. The opening phase of the war was largely a matter of jockeying for positions. But on the 17th the Red and Blue air forces came together for their first encounter, and the Red army pursuit planes scored a decisive victory over a Blue bombardment fleet. The Reds prevented the enemy from accomplishing a bombing mission and "destroyed" four of the fifteen bombers. In the end it proved a costly victory for the Reds.

Both forces mixed it continually in the opening engagement. The Blue bombers were sent out with instructions to bomb a Red transport depot at Hebron, Ohio. The plans called for a protecting escort of pursuit ships, but as is the way with all wars, actual or simulated, someone slipped up somewhere, the protecting pursuit squadron failed to meet up with the bombers and the Blue Keystones were forced to go on the mission alone. The Blue bombers were spotted by a Red observation pilot who hot-footed it back for his playmates. The result was that the attacking bombers were met by a host of twenty-four Red pursuit planes. The pursuit attack on the bombers was so neatly executed that even the umpires had to admit that the Blue forces were rather badly set back. The Blue retaliated immediately, however, and were successful in catching fifteen pursuit planes on the Red airdrome and put them completely out of commission.

And that was but the first day of actual fighting. The


International Newsreel photo
Wright Field near Dayton, Ohio, showing Army planes assembled for the mimic war over Ohio.



International Newsreel photo

Lower New York, showing the river illuminated by flares, representing bombs, dropped from the air by an Army bomber.

severest critics of the air end of this recent war certainly can have no complaints regarding the amount of action that the Air Corps men provided.

War games are rather disappointing in their inability to provide anything definitely decisive in the way of victories and defeats. The fair-minded umpires have a weakness for saying, "Let's start over again," and the only lessons which one is permitted to learn are those extremely involved with technicalities, which have a way of getting into archives and being interred there while their ghosts go abroad to plague each new and succeeding class at the War College for years to come.

The larger and more significant truths of the recent war, which there seemed to be a general disinclination for the official participants to comment upon, were two in number. The first of these was the maladjustment of the land and the air forces. In a number of instances, decisive action was lacking on the part of ground operations which materially affected the force of the air operations. The effort to gait the speed of the air power to that of the land power resulted in much wasted effort. In one or two instances, ground control was unable to handle or judge the speed at which the army planes would be able to carry out a planned maneuver. Certainly, it would appear here that there exists ample justification for a unified and independent air force.

The second lesson is perhaps older, but it was demonstrated anew in the Ohio war games. This lesson is that the armed forces of the air are basically weapons of attack, that two opposing enemies can best employ their planes in attack, and that while the Blue is raiding one section of Red territory, the Red is attacking another sector of the Blue territory, and the greatest damage is done to both sides without the air powers of both forces ever meeting.

Whether this lesson of the late war will ever get far abroad is a matter of conjecture; but its full effect, if it is ever felt, should do much for the building up of larger and larger air forces, for it will provide a weapon which can strike with lightning rapidity and deliver its blow in what in former times was called non-combatant territory where not only the food and machines of war are gathered and stored, but where the spirit which keeps wars going is engendered. They strike at supplies and morale.

The most spectacular stunt of the games clearly demonstrated this point. The flight of the Hornet-powered Keystone bomber from Wright Field on its successful bombing mission to New York was the instance. Extraordinarily thick weather which banished all opposing and assisting aircraft from the sky considerably marred the original plan of the attack, and made the achievement mainly a demonstration of the high courage, skill and splendid morale of the Air Corps, as represented by Lieutenant Odas Moon and the men who flew with him.

In the original plan, the bomber was to be met by a refueling plane which was to have been hidden at Middletown, Pa. When weather indicated that this would be inadvisable, the refueling station was changed to Bolling Field. But the Douglas refueling ship was able to get no farther east than Uniontown, Pa., and it was believed for a time that the necessary fuel could be taken on in flight at this point. But when Lieutenant Moon and his companions in the bomber, Lieutenant Eugene L. Eubank, Paul G. Richter, Charles T. Skow and Mr. Bradley Jones, arrived at Middletown the weather had closed in so completely that the refueling ship was not allowed off the ground and Moon had to forge on ahead without its assistance. Undeterred by some of the worst weather which the eastern section had known in weeks, Moon brought the bomber through its appointed rendezvous, raided New York and, with rather discouraging accuracy, put five flares down on Governors Island, headquarters of the Army 2nd Corps Area.

In this connection the comment of Colonel Trumann O. Murphy, duty officer on Governors Island, is interesting.

Said Colonel Murphy, reporting hearing the plane, "It was impossible to see her without playing a light upon her. We have no such lights on the island. Of course, we would have if she had been a real enemy plane. Since we could not see her, anti-aircraft guns were of no value."

So while it is true, as General Nolan said, that the war was fought, "for the higher tactical instruction of general officers and their staffs," the opportunity which it afforded the Army Air Corps was something higher still, something approaching the rarest of rare opportunities, and more than an occasion of intensive training under war-like conditions.

MY FLIGHT TO 39,140 FEET

By Lieut. Apollo Soucek, U. S. N.

Holder of the World's Altitude Record

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TODAY (May 8) is the day we have been waiting for more than a week. The sky is clear of clouds, the air cool, the sun brilliant.

My Wright Apache plane is on the line, the mechanics are giving it the last touches — forty gallons of gas in the tanks, which must lift me higher than man has ever flown before. Captain Luke Christopher, chairman of the contest committee of the National Aeronautic Association, with the aid of Chief Electrician's Mate Fagan are sealing the barographs and placing them in the compartment next to my oxygen bottles.

Times Wide World photo.

Lieut. Apollo Soucek in the cockpit of the Wright Apache altitude plane.

I am almost stifled in my heavy flying suit, boots and mittens, while Commander F. H. Sears, flight surgeon of the Naval Air Station, plugs my nostrils to force me to breathe through the mouth; adjusts my goggles, with their six pin holes through which I must see when the glasses eventually become covered with frost, coats them in attempts to slow down the frost formation and adjusts my helmet and face mask.

Chief Machinist Mates Enricksen and Kidder, who have nursed my plane for weeks in preparation for today's venture, give the engine a last test.

Mechanics cling to the tiny plane to hold it down as I race the motor. Everything is ready. The day is perfect. We ought to do it today if at all. I taxi the plane out into the field.

The take-off is easy, after a run of 25 yards. I slip my goggles over my forehead to prevent the collection of moisture until I need them and head out over the Potomac. We're off.

My left eye begins to pain, a grain of sand driven into it as we took off, which may cause trouble. It is uncomfortable breathing through my mouth as the plane, stepped at an angle of thirty degrees, climbs rapidly—3,000 feet a minute for the first few minutes.

It's a long way up, so I throttle the motor down slightly to save it for the big pull at the top.

I had determined to make the climb in ever widening circles, with the naval air station, my home field, at the centre. The first 10,000 feet is easy—in about four minutes.

The atmosphere is as clear as crystal. Off to the north I can see Baltimore clearly. To the west is the smoke fringe of the Blue Ridge Mountains.

But that was just a glance over the side. My eyes belong on the instruments in the cockpit. They need more eyes and hands than I have.

Now we are at 12,000 feet. Time to turn on the oxygen, ever so slightly; not that I need it now, but Dr. Sears says it is best. I want to conserve all my strength for the long pull up above. I can do this by using the oxygen at the earlier stages of the flight where the air still has enough oxygen to sustain life. By this time the ever widening circles of my flight are fifteen miles in diameter.

Now we are up to 15,000 feet. A strong southwest wind at this altitude, fully seventy miles an hour. Too strong to permit me to maintain the circles I had planned. The wind is blowing as fast as the plane up in this level.

The best thing to do is to stick my nose up into the wind and let both the wind and the motor lift us. So we climb up into the wind, staying over the same spot, apparently right over the Arlington Memorial.

We are climbing now at a little steeper angle. I pull back the stick to get up faster.

The air speed indicator says we are traveling at 75 miles an hour. I am supposed to slow down the speed one mile for each 1,000 feet of climb. We will be going just as fast, but the air, as it grows rarer, flowing through the venture tube to the air speed indicator, does not actuate the indicator as much as down on the ground. The rate of climb is probably falling off, but I guess we are getting better than 2,000 feet a minute even now.

My radius of vision begins to increase. The clear day enables me to see a horizon now 50 miles away. Now we are at 20,000 feet. I begin to feel the cold air around my eyes.

The temperature is falling rapidly, so I put on my goggles to prevent the possibility of freezing my eyes and eyelids. The plane keeps its steady climb into the wind, on up to 30,000 feet. The appearance of the earth below is much the same as at 20,000 feet.

Now we are getting up into it. From now on things will go harder. The engine begins to show signs of needing more air. The dial which shows engine revolutions drops from the normal 2,000 revolutions a minute to 1,700. We can't go much higher without more air in the engine. The air is too rare.

Time to close the supercharger valve, deflecting the air into the carburetor, reproducing the conditions on the ground. The Wasp picks up at once, the engine revolutions go back to normal. The old ship is climbing again at a better rate, but still much slower than down below.

All this time I have been opening the oxygen valves wider and wider. Breathing becomes more difficult. I am feeling a little bit weak and very tired, as if I had not slept for days. That's the signal again—I need more oxygen.

Time, too, to supercharge the gas tank. The gas pressure is getting low. I need that gas in the engine. Still we climb. Now we are at 37,000 feet, where the trouble begins. Though we are headed westward and making probably sixty miles an hour, the wind is too strong for us. It is carrying us backwards, slowly. At this same speed we would be making ninety miles an hour on the ground.

I don't feel the cold, but I realize that it is getting very cold. My shoulder is tired from the strain of pushing on the supercharger valve. I try to turn to keep the bend in the Potomac at Washington in view, but it is hard work. The light oil which lubricates the controls—the ailerons, elevator and rudder,—has frozen, and it is all I can do to move that stick.

Now comes the tough part. Now the battle will begin in earnest. However, everything has gone so successfully thus far, I have visions of climbing to at least 42,000 feet on my altimeter. It looks within my grasp. I had better look around. From now on I'll be too busy to look out again. I need my bearings, too. I can still see the Potomac's bend at Washington, but the naval air station has disappeared.

The capital is a blur on the ground too small to permit me to distinguish buildings. I can see the fine, parallel lines of streets. Hains Point stands out like a tiny pickle.

North of me I can see the head of Chesapeake Bay and the fine line which indicates the course of the Susquehanna River. South I can see down the bay to where it joins the Atlantic at Hampton Roads. The Potomac isn't big any more. The country below looks like nothing but a crazy quilt of tan and green patches, with the fine line of the river like a tear in the cloth.

The bay and rivers are fine points of reference when you are so high above the earth. The sun is almost overhead, its rays silvering the water. To the westward a haze is beginning to obscure the mountains, but I can follow the course of the Potomac almost to Harper's Ferry.

The view is beautiful, fascinating, but I must get back to work. If I can get 5,000 feet more there will be no doubt of establishing a new record. But my optimism doesn't last long.

Several things happen simultaneously. In the first place the altimeter seems to stick at 38,000 feet. A cloud comes across my eyes. I recognize the frost slowly beginning to form on the glass of my goggles. No use trying to wipe it off. I can't touch the inside of the glass where the frost is. I hope it will clear up, but instead of clearing it grows steadily heavier.

Now I will have to rely upon the tiny holes bored in the glass. I am not entirely without use of my eyes, although my vision is restricted, so much so that it is impossible to see the horizon or to view the instruments closely. I don't want to remove the goggles, but I have to. I push them up on my forehead.

I am beginning to get pretty weak. Humans don't belong in this altitude. I need more oxygen and open the emergency valve, gulping down a good deep breath.

I feel somewhat better, but we are not climbing very fast. I have to put my head down in the cockpit behind the cowling. My eyes are freezing and very painful. My right hand is beginning to get cold from holding the frigid stick, although the rest of my body is warm.

To return to the field now would be failure. We will keep going as long as we can. The altimeter must be frozen. It seems to be sticking now at 39,000 feet.

I increase the angle of climb slightly. This does not seem to help a great deal. The time passes like hours before I push the altimeter up to 40,000 feet. But I am not satisfied. I try to climb higher. My eyes are causing considerable trouble, so I push the goggles back down. I don't want to injure them for a record.

I have to fly with my knees controlling the stick. My left hand is busy holding the supercharger throttle. Although the automatic spring which would pull it closed and slow down the motor if I fell unconscious is not heavy, it seems as if it were a heavy weight.

I hold my goggles with my right hand like a lady with her lorgnette. In this way I can break the wind and get an occassional glimpse about.

Still we do not climb. I am getting pretty impatient and weak. I feel a strange dizziness, anticipated but nevertheless annoying. I let the oxygen flow continually now through the emergency tube to be sure I do not faint for lack of it.

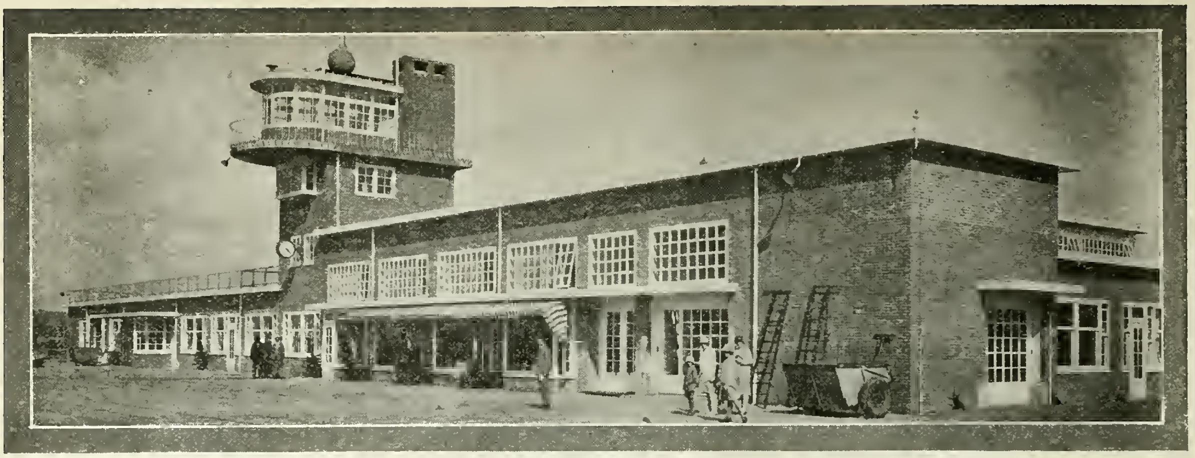
The plane already is wavering as if it cannot go higher. But I am determined to force it up at any cost. I stick the nose higher. This is not wise, I soon learn. Almost before I realize it the nose whips over and we are falling crazily in a spin. That was the plane's peak. We could go no higher.

Well, what of it, I think; let her spin; that lazy feeling is comfortable.

I let go the throttle of the supercharger. The motor slows down to idling speed. The air is so light and the controls so tightly frozen that we fall 2,000 feet before I work out of the spin. I spiral down in great circles, slowly, so there will be no ill effects to plane or pilot from the descent. My ears, though, ache from the growing pressure.

Now the field is coming into sight. The job is nearly done. I circle a few times and then slip down through the gully into the field. The men who have helped me come to greet me. I climb out again after an hour and twenty-four minutes in the air. It was worth it. I am feeling fine.

The men at the station congratulate me. But I tell them it could not have been done without their help, for it required the work of many men to make the fight possible. the approval and aid of Rear Admiral William A. Moffett, the Chief of the Bureau of Aeronautics; of Commander James M. Shoemaker, chief of the engine section, and Lieutenant Moore and Fliedner, the engine expert, his aides; of Lieut. Commander J. R. Poppen of the Medical School, of Dr. Sears and of Lieut. Commander D. C. Watson and Lieutenant J. J. Clark of the Naval Air Station. All helped and without them the flight could not have been made.



The passenger station and control tower at Schiphol Airport, Amsterdam, as seen from the aerodrome side.

SCHIPHOL, MUNICIPAL AIRPORT OF AMSTERDAM, HOLLAND

By U. F. M. Dellaert

Chief Aerodrome Officer

SCHIPHOL Airport is operated by the Municipality of Amsterdam, Holland, under Amsterdam Sea and Airport directorate (Gemeente - Handelsinrichtingen). A good road leads to the airport from the center of the city, a distance of eight miles. A public service company is running first class buses from the city to the aerodrome on a 25-minute schedule.

The landing field at the airport is unusually level. The form of the field is square, the dimensions being 900 by 900 yards. In addition to this field of 150 acres, an adjacent field of 75 acres which has been purchased by the city is to be used for future hangar extensions. These projected buildings will be laid out in such a way as to present a minimum obstruction to planes taking off and landing at the airport.

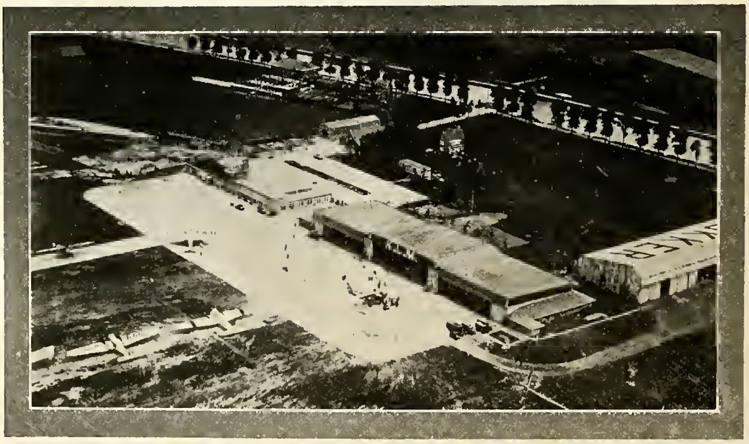
The surface of the field is covered with an excellent grass-mat, and an efficient drainage system has been installed to keep the grass-mat in consistently good condition. A wide concrete apron (covering four acres) has been laid in front of the hangars and building along their full length. This apron is to be enlarged to cover fifteen acres during this summer.

All the buildings and hangars are grouped along the southeast side of the aerodrome. Two gaps, each 150 yards wide, in this row of buildings are kept open for planes gliding in. The three other sides of the aerodrome are free from obstacles, and the aerodrome is surrounded by an expanse of flat country.

In the station building, there are separate enclosures for incoming passengers, outgoing passengers, transit passengers, offices of air traffic companies, government wireless and meteorological services, offices of municipal aerodrome officials, customs offices, goods clearance compartments of incoming goods, outgoing goods and luggage, air mail office, waiting-room and restaurant, and customs inspection of luggage.

A traffic control tower surmounts the station building. The upper part of this tower consists of a glass observation room surrounded by a balcony, from which the traffic officer gives the starting signals to the planes of the various companies. These signals are operated by electrically lighted letters and a signalling lamp. The various lamps of the complete night landing equipment are all switched on from the control tower.

Whenever a commercial plane comes in sight, a siren signal is given from the tower to notify officials and customs officers who have to deal with arriving planes so that they may be at their respective posts when the plane lands.

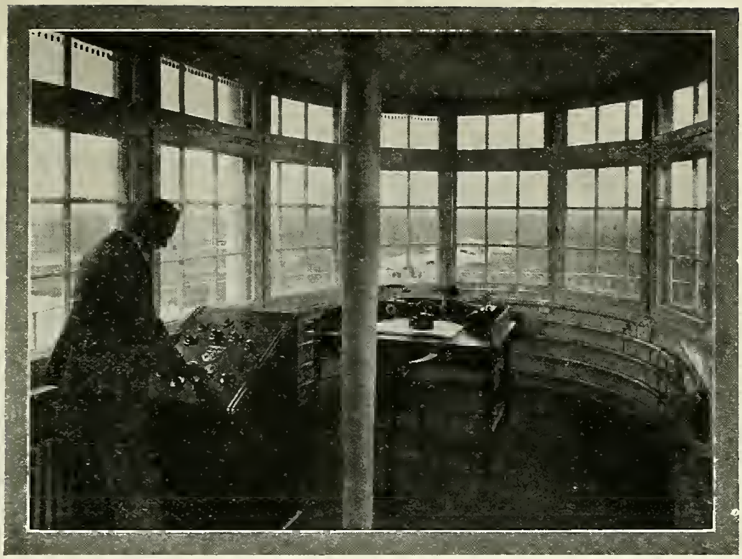


Part of Schiphol Airport, Amsterdam, Holland, as seen from above.

The night landing system consists of a fixed Neon beacon light on top of the wireless mast (which is 135 feet high), red lights on all obstructions at the edge of the field, red boundary lights around the landing field, landing T automatically lighted, and eight fixed landing lights which are located at equal distances along the boundary of the field.

These light the field, each light throwing a beam of 90 degrees top-angle towards the middle of the field, so that the beams partially converge. The eight lamps are three kilowatt electric bulbs, each having a mirror reflector and a set of lenses which bring the light up to 300,000 candlepower. For night landings, two or three adjacent landing lights are used according to the direction of the wind.

On the roof of the observation cabin are the masts which support the antennae of the wireless direction-finding station.


The control tower at Schiphol Airport, showing landing light switches

Two modern heated hangars of steel house the planes of the five air traffic companies which are established at the airport. One hangar of approximately 30,200 square feet is 328 feet long and 92 feet deep. It has three doors, two of which are 82 feet wide, the middle door being 98 feet wide. The second hangar, of about 38,700 square feet (295 by 131 feet), has two doors, each 131 feet wide. In addition to the hangar space, there are about 10,000 square feet of offices and stores built adjacent to the hangars.

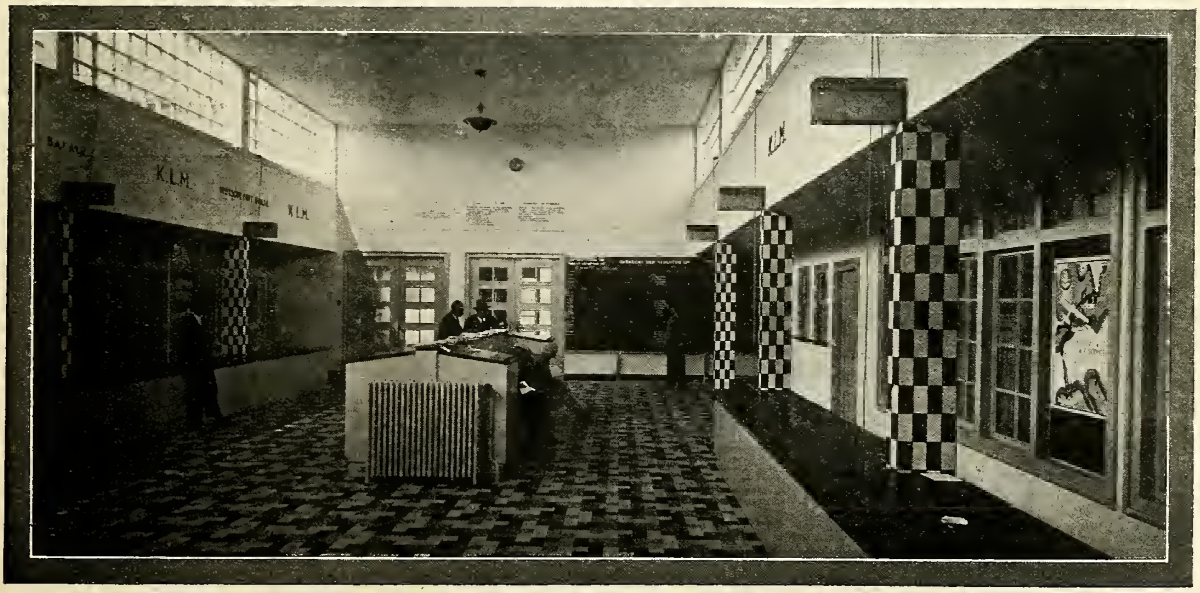
A third hangar of 24,860 square feet belongs to the Netherlands aircraft works of the Fokker company. The European factory of the Fokker planes is established at Amsterdam. The airplanes produced by this company in Holland are transported by ship from the town to the airport. They are then assembled in the Fokker hangar and later tested at the aerodrome.

A modern petrol supply system, consisting of five underground tanks with a 14,500 gallon capacity, and electric pumps is maintained at the airport. By means of this fueling system, seven machines at a time can be filled at seven different places on the concrete apron and in the hangars. The capacity of this system is to be increased this summer to a tank capacity of 40,000 gallons to provide increased refueling service.

Five air traffic companies are established on the airport. Of these the national company, the Royal Dutch Air Transport Company (K. L. M.—Koninklyke Luchtvaart Maatschappy) is perhaps of most importance at Amsterdam. The company has a fleet of single, twin and three-engined Fokker planes and single-engined Fokker freight carriers.

It maintains daily services from Amsterdam to London, Rotterdam, Brussels, Paris, Basle, Zurich, Bremen, Hamburg, Copenhagen and Malmo in Sweden.

Apart from its airline operations in Europe, the K. L. M. is establishing regular air connection between the Dutch capital, Amsterdam, the market place of the Dutch colonial products, and Batavia, the capital of Holland's colonies in East India. Several flights over this 9,300-mile airline were made during the past year, on which trips many tens of

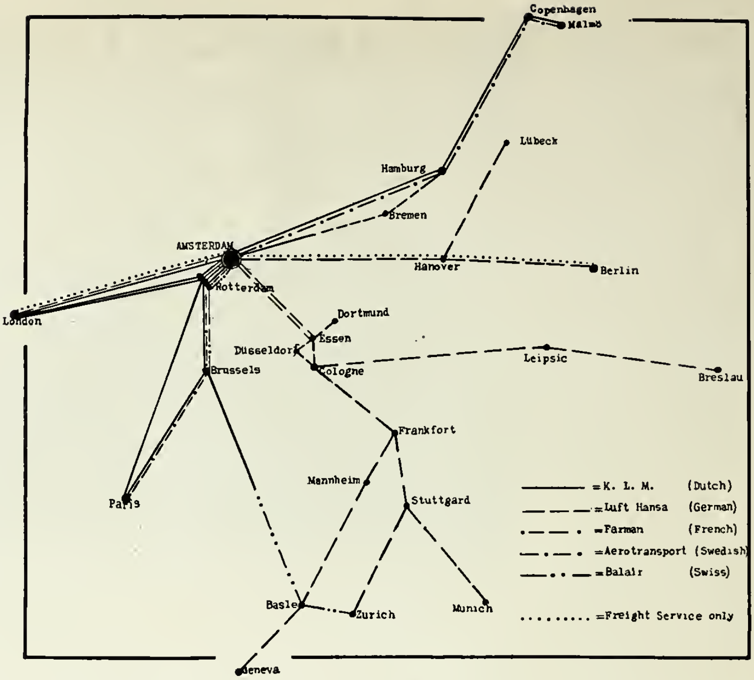


Hall for departing passengers at Schiphol Airport; transport company offices at the sides.

thousands of letters were carried in very fast time.

Another important company at Schiphol is the Deutsche Luft Hansa, which runs daily services from Berlin, Hamburg and Bremen to London, via Amsterdam, and from Amsterdam to southern Germany and Switzerland. The French company, Lignes Farman, maintains a daily service to Paris and Brussels. The Swedish company, Aerotransport of Stockholm, flies from Malmo to Amsterdam, and the Swiss company, Belair, from Zurich and Basle to Amsterdam.

The huge growth of pay loads (passengers as well as goods) is clearly indicated in recent statistics on the subject. From 1927 to 1928 the number of paying passengers on the airlines increased from 10,775 to 13,590. In addition to these passengers on the international airlines, 7,648 paying passengers were carried in short trips over the town of Amsterdam and over the flowering bulb fields between Haarlem and Leiden.



Map showing daily services from Schiphol Airport, Amsterdam.

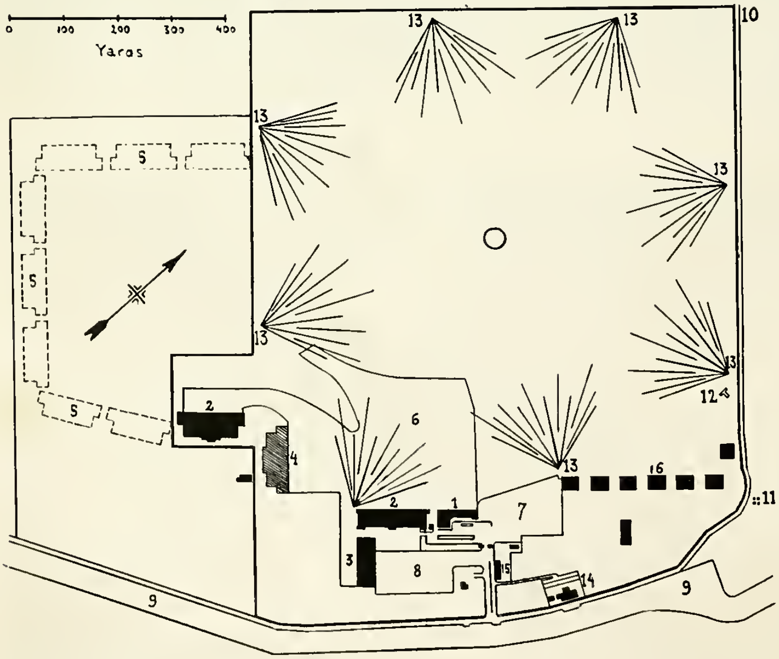
The quantity of goods increased 60 per cent from 1927 to 1928. There were 1,100,000 pounds transported in 1927 and 1,755,000 pounds in 1928. A big share of the exported goods consisted of cut flowers (roses and lilacs) from the world famous flower place Aalsmeer, which lies at only four miles from the aerodrome. These flowers are chiefly exported to Germany and Scandinavia.

A car park was recently constructed outside the field, and enclosures are being put around the installations. After these works have been finished the public will be admitted only after paying a small entrance fee for this privilege.

An excellent restaurant with big terraces, which afford an unobstructed view of the landing field, is located on the dike of the adjacent canal. Many thousands of people from Amsterdam and the whole countryside come out by car and sailboat to watch the giant airliners which come from the four ends of the wind.

In its entirety, Schiphol Airport is an eminent example of the systematic and efficient methods practiced at the principal airports and on the main air lines of Europe. Every precaution has been taken to assure the maintenance of precise schedules for arriving and departing airliners, and to provide the maximum safety in landing and taking off. Such conveniences for passengers have been established as are found only at the more important railway terminals of the world. Indeed, some of the facilities offered, such as the restaurant with its terraces, would probably be impossible to maintain profitably on any railroad system.

Airport engineers in the United States must look to airports of this character for ideas on management as well as architecture. The methods of building, layout of facilities and the traffic regulations adopted at Schiphol airport represent years of practical operation, involving various types of air transport systems owned and operated by companies from six important European nations. The whole aspect of Schiphol presents to the air passenger the assurance that he will be carried swiftly, comfortably and safely to his destination.



Layout of Schiphol Airport. 1—Station building. 2—Hangars. 3—Fokker hangar. 4—Projected hangar. 5—Future hangar extensions. 6—Concrete apron. 7—Public enclosure. 8—Car park. 9—Canal. 10—Road to Amsterdam. 11—Beacon light. 12—Illuminated landing—T. 13—Landing floodlights. 14—Hotel—cafe—restaurant. 15—Canteen. 16—Military hangars.

BIGGER AND BETTER BALLOONS

By Don Rose

THE tensile strength of my air-minded imagination has been sorely tested during the past week or so. There has been right smart going on in the air, so that I feel just now like a small boy with a stiff neck at a three-ring circus. I don't remember that anyone officially appointed this as Aviation Week, but if they had they would now be patting themselves on the back for a highly successful performance.

There was, for instance, the nice little military demonstration out in the Middle West. There were the Washington meetings, whereat Harold Pitcairn turned up in the Autogiro and left the industry mildly goggle-eyed and looking for alibis. The flying windmill took its first long trip in this country and back again, clocking the course at 110 miles an hour and alighting at both ends with a landing run of at least three feet. That was something, if you ask me. There was also the Packard petroleum engine, which flew into Langley Field under wraps and stayed that way until it had aroused a thousand columnar miles of newspaper curiosity. I gather that it was supposed to be a secret, which is why two newspaper correspondents were granted a peep at it. If you want to keep something as secret as the time of day, tell it to two newspaper correspondents.

On top of all this, with additional entertainment from one airport convention, an altitude record, a woman's endurance record. thirteen new airports and few thousand miles more of air mail service, the *Graf Zeppelin* stuck its nose out over the Atlantic looking for Lakehurst, where most of the population of the Eastern United States was gathering to greet it and to eat hot dogs in rolls modelled more or less along the lines of its classic contours. It was too bad indeed that they were disappointed, and a tough break for the *Graf* and her commander and crew. The only consolation in the situation is that real tragedy was cheated by good sense and caution. The passengers should have little to complain about, even though they were all looking forward to a serene and enjoyable crossing and a Saturday evening dinner in New York City, including that persistent patron of the international radio-telephone, Mrs. Pierce. Mr. Pierce, it seems, was not so keen about it, probably because he looks forward now to a future in which he will be known only as the husband of Mrs. Pierce, sole lady passenger on the second commercial flight by air. I am not counting, you see, the lady gorilla, who seems to have been some sort of official chaperon, nor the grand piano which was carried along for no reason that any expert has yet explained. The aeronautical implications of a grand piano are still beyond me, but I suppose somebody had to carry a grand piano by airship and get it over with. There is still to come the airship wedding, the airship bridge party, and the airship tennis match, but after a while all the old publicity stunts will have gone safely through their second incarnation and we shall be able to get down to business.

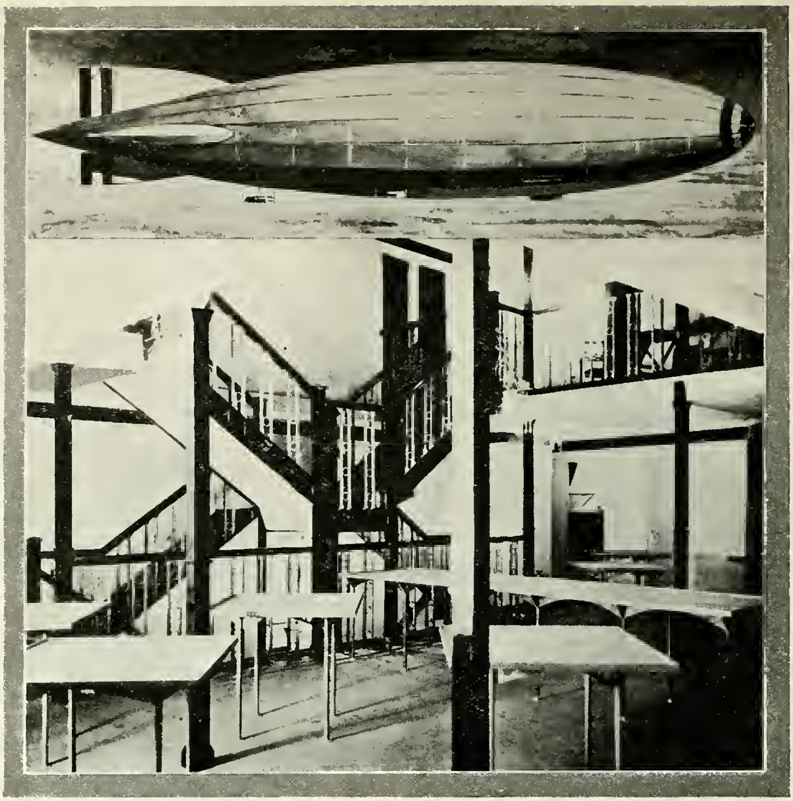
There was, it is true, some delay in getting away from Europe on this second trip, but for this no sensible bystander will bring blame or complaint. It was pretty well hammered into the public's head that this was a business trip and a commercial crossing, and in no sense a stunt or pioneer demonstration of what an airship could do with the aid of luck and good weather. There were passengers on board who had paid for safe passage regardless of the thrill and novelty of holding a ticket on the first airliner. Since the ocean is wide and wet, the Commander chose to play safe rather than be sorry, and turn back while the repair shop was still within reach. It was too bad, but the only real sufferers were the tens of thousands of hot-dogs that went stale at Lakehurst, and no doubt science and the ingenuity of man found something to do with them.

The commercial implications of the *Graf's* second trip gave it its real importance. The rigid airships are making this year their bid for business. It is, to be sure, their turn. The airplane got off at a fast pace during the latter years of the war, and has dominated the skies ever since. It was not always thus. In the earlier days of the great unpleasantness, the Zeppelins had things pretty much their own way, and it was, in fact, their troublesome presence that did much to stimulate airplane design to the point where planes could outclimb and outmaneuver the airships and shoot them full of incendiary bullets, which spoiled them quite a little. This in turn stimulated defensive technique, so that the aviation experts of all nations sharpened their wits on each other for three or four years of war, and boosted along the plane's progress at an amazing clip. But let it not be supposed that the authorities thereby lost sight of the airship's possibilities. If they had done so, they would not have thrown so many post-war restrictions around Germany's construction of rigid aircraft. Only lately have these restrictions been lightened, and the first consequence is the *Graf*, the biggest ship that could be built at the time in the biggest shed in Germany.

It is interesting to note that bigger and better airships is the slogan of the development of lighter-than-air craft. The *Graf* is considerably bigger than the *Los Angeles*; the new British airships will be half as big again; the two now building at Akron for the U. S. Navy will top everything in sight by a million and a half cubic feet. This is not the consequence of any competitive desire to own the biggest balloon in the world. It is a matter of efficiency and safety. The bigger the ship, the more weight it can carry in proportion to its bulk and power, and the less likely it is to crack under the strain of service. In this respect, the airship has an edge—for the present at least—on the airplane. The load capacity of a plane steps right along with the horsepower needed to fly it, and after a certain point the useful load begins to vanish altogether. Those who draw the pretty pictures for the Sunday supplements sometimes forget this, but the designers don't. For the present, at least, there is a limit beyond which the airplane becomes less rather than more efficient.

But the practical size of airships seems to be limited only by the size of sheds big enough to build them in. At the same time the cost goes up pretty steeply, until it gets within shouting distance of the price of a battleship. This is one reason why the airships have seemed to move slowly into their place in the sun. A few thousand dollars can build an experimental plane, but it takes a few million to put an airship in the air so that somebody may find out what it is good for. If it turns out that some designer was a little too optimistic or the weather turns unreasonably nasty or something else occurs to spoil the experiment, it's a long and laborious job to find the money to try again.

At the same time, we need to recall that a lot of work has been done on lighter-than-air craft, and these new ships are by no means blind guesses or long chances. The first balloon went up not long after the Declaration of Independence, and something has been happening ever since. Germany built over a hundred Zeppelins before the war,



International Newsreel Photos.

Upper: New British dirigible R-100, accommodating 100 passengers; lower: interior view of the restaurant and staircase in the R-100.

carried 32,000 passengers in them, made a profit out of their operation, never had a passenger casualty in them nor lost one of them by structural failure in the air. The Goodyear Company, — which is now, as the Goodyear - Zeppelin Company, building America's two aerial giants, — has built a thousand balloons and over a hundred airships. This experience has not gone for nothing, nor have the few tragic failures of the bigger airships left behind no encouraging lessons for the future. Just as the modern plane has risen like a phoenix from the ashes of many sad crashes, so the future airship will owe much to the flights that failed. And their principal lesson has been that airships must be big to be safe, just as they must be big to be useful.

So we cannot look just now for much in the way of sport-model airships, and the girls need not worry about walking home from balloon rides, at least in the immediate future. Further we can figure that the airship has a different job ahead of it than the airplane, and one which it is better suited for than the airplane can hope to be. This idea may irritate those heavier-than-air enthusiasts who claim that the airplane is good for anything, from cutting the grass to flagpole sitting, but it's a matter of business sense. And if you examine closely into the present excitement over airships, you will find that a lot of it arises from the efforts of hard-headed business men to get in on a good thing.

Three nations are making bids for first honors in airship construction,—Germany, England and the United States. Germany's program is a revival of the Zeppelin construction plan, with the considerable difference that it must get along now without much aid or comfort from government subsidy. Another big ship is planned to follow the trail of the *Graf*, but at present there is no hangar big enough to build it in. An experimental ship on a small scale was built this year, but it failed in trial flights, proving once again that little airships are not so good. Whatever happens, however, to German airships in the near future, their construction will be principally for commercial purposes.

England got a nice share of the Zeppelins that were surrendered under the peace treaties and immediately made them into floating laboratories of experiment or tore them apart to see how they were done. There followed the construction of the R.34, which made an elegant round trip to America, and the R.38, which broke up principally because its designers thought they might be able to cut corners a bit and build for lightness and speed. The two five million cubic foot craft that are now nearly ready for the air have an interesting idea in back of them. England has a loose-jointed sort of empire, spread in patches all over the round world, and now that the colonies are becoming increasingly independent and self-sufficient, its becomes increasingly important to keep them closely in touch with the home office. The Secretary of State for Air has preached for years the policy of encouraging air traffic for the good it will do to empire efficiency. His program has included airplane lines over land and airship lines across the seas and the wide open spaces of desert and rough country that make up the insides of some of the continents. He wants to be able to call a meeting of the board of directors of the British Empire, the premiers and governors of the colonies, and have these gentlemen on hand in a few days instead of a few weeks. There's no way to do it except by air.

So the two big British ships will make their first long trips to opposite ends of the empire. One will fly to Montreal, where a mooring mast is ready. The other will set out for India, making a stop-over at the mooring mast in Egypt and harboring at a place called Karachi, which is somewhere on the Indian map. The first intention is to show that it can be done. The second is to establish empire communications on the modern scale. The third is to encourage commercial enterprise to do the same. It is an old tradition of English policy that "trade follows the flag." The new lines of trade will follow the trails of these flagships of the air.

In the American story there was the *Shenandoah* and there is the *Los Angeles*. You will recall that the latter was a peace-offering from Germany, built to replace the two Zeppelins which were awarded to this country by the peace settlement and which were destroyed by their crews in a last-minute flare of misguided patriotism. She came over here under her own power, and for five years has cruised the American skies with safety and distinction. Recently she inaugurated our

(Continued on page 252)

FIELD LIGHTING, RADIO AND INTER-FIELD COMMUNICATIONS

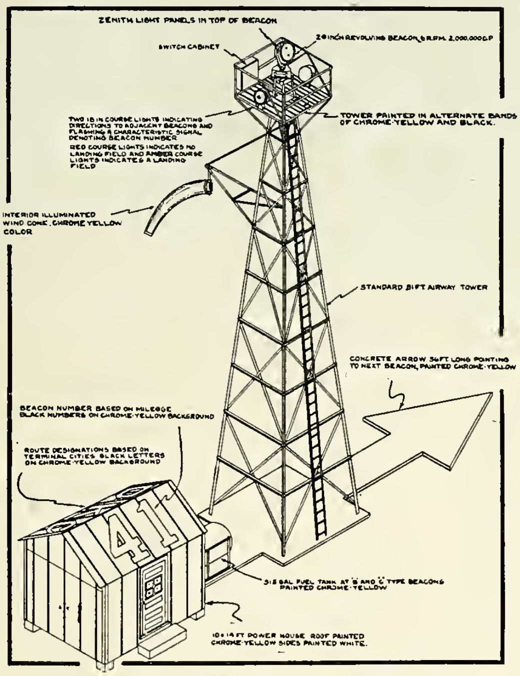
By

F. C. Hingsburg

Chief Engineer, Airways Division
U. S. Department of Commerce

THE United States has assumed leadership in the development of night flying and this is due primarily to the necessity of flying the mail at night. Each night, more than 15,000 miles are flown over the airways in darkness under all conditions of weather. The terminal fields and airports along the routes are under the management of municipalities and private enterprise.

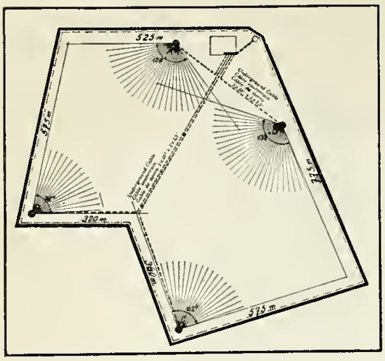
Terminal airports with adequate lighting facilities for night landings are essential to assure that every landing will be a safe one. Bad weather, delayed schedules or a forced landing may cause delays, and airplanes may arrive at the airport at any time, night or day. At night the first concern of the pilot is to pick up the flash of the airport beacon that locates the terminal field. It is a comfortable feeling conducive to safety of operations to know that the lighting system at the airport is operated reliably from sunset to sunrise. A green auxiliary light flashing a distinctive code signal of 5000 candlepower identifies the terminal field with positiveness. The airport beacon may be a flashing beacon of 100,000 candlepower with luminous period of 10 per cent or a 24-inch rotating beacon. The Department of Commerce rotating beacon has a 1000-watt airway lamp and 24-inch parabolic mirror developing two million candlepower flash which is shown every 10 seconds. Prisms on the front cover glass deflect light upward from the horizon to plus 55 degrees which provides the required light indication for airplanes at close range or flying at high altitudes. The zenith light is especially advantageous at landing fields. Under conditions of low ceiling, the zenith light plays on the clouds in an interesting manner as the airways beacons rotate and the pilot cannot fail to note the changing conditions of atmosphere as he passes over the airway. A lamp exchanger increases the reliability of the airport beacon. The beacon is motor-driven and an auxiliary contact mechanism synchronized with the period of revolution furnishes current to the course lights or the auxiliary green code light for airport identification. The airways beacons are mounted on structural steel towers, whereas airport beacons are usually mounted on the hangar roof and the light is elevated to project on an airplane 1000 feet above the adjacent beacon.

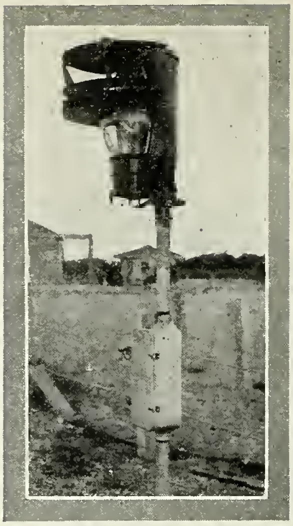

ZENITH LIGHT PANELS IN TOP OF BEACON
SWITCH CABINET
24 INCH REVOLVING BEACON, 6 R.P.M. 2,000,000 C.P.
TWO 18 IN COURSE LIGHTS INDICATING DIRECTIONS TO ADJACENT BEACONS AND FLASHING A CHARACTERISTIC SIGNAL DENOTING BEACON NUMBER
RED COURSE LIGHTS INDICATES NO LANDING FIELD AND AMBER COURSE LIGHTS INDICATES A LANDING FIELD
TOWER PAINTED IN ALTERNATE BANDS OF CHROME-YELLOW AND BLACK.
INTERIOR ILLUMINATED WIND CONE, CHROME YELLOW COLOR
STANDARD 51 FT AIRWAY TOWER
CONCRETE ARROW 54 FT LONG POINTING TO NEXT BEACON, PAINTED CHROME-YELLOW
BEACON NUMBER BASED ON MILEAGE BLACK NUMBERS ON CHROME-YELLOW BACKGROUND
ROUTE DESIGNATIONS BASED ON TERMINAL CITIES BLACK LETTERS ON CHROME-YELLOW BACKGROUND
41
515 GAL FUEL TANK AT 'B' AND 'C' TYPE BEACONS PAINTED CHROME-YELLOW
10 x 14 FT POWER HOUSE ROOF PAINTED CHROME-YELLOW SIDES PAINTED WHITE.

Standard installation of Airways beacon.

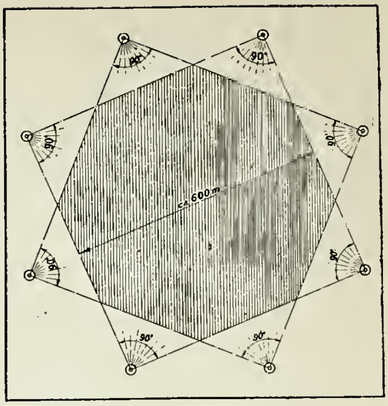
Having located the airport, the pilot maneuvers for position to land and his next concern is to learn the shape and extent of the landing area and best runways. The landing area is outlined with white or yellow boundary lights spaced approximately 250 feet apart around the field. Boundary cones are sometimes used in conjunction with the lighting system. Red obstruction lights are mounted on all obstructions surrounding the field. Where practicable the obstruction lights are in the boundary circuit. The principal runways are marked with green range lights. Multiple circuits are used for intermediate fields, whereas the series circuit is usually found advantageous for airports. Multiple circuits require the use of 25-watt, inside frosted, lamps for white lights, but 50-watt lamps are used for colored lights to show up distinctly the same distance as the white lights. Series lighting requires 600 lumen 6.6 ampere lamp for white lights. In series lighting the open voltage above ground must be less than 450 volts and the operating voltage 310

An airport hangar at night, showing regular lighting arrangement.





Illuminating an unsymmetrical field. (Right) Crouse-Hinds floodlight provided with horizontal directing vanes.



Floodlighting system used in Europe.

volts. The details of the circuits are described in the Airport Rating Regulations. At Templehof, Berlin's noted airport, neon tube lights have been effectively used to border light the landing area. This system is especially advantageous to contrast with competitive lights and the airport is unmistakably and distinctively marked. The neon lights have not been found to have fog penetrating characteristics in this country, but the color characteristic has some advantages in the matter of visibility in thick weather.

All landings are made into the wind, and for this purpose the wind direction must be observed from the lighted wind tee or wind cone. Neon or mercury-argon lights are very effective for outlining the wind tee. The wind indicator should be visible at least 1000 feet and show the true direction of the wind. The hangars and other buildings are floodlighted for perspective indication by use of industrial reflectors or floodlight projectors, the average illumination being 2½ foot candles.

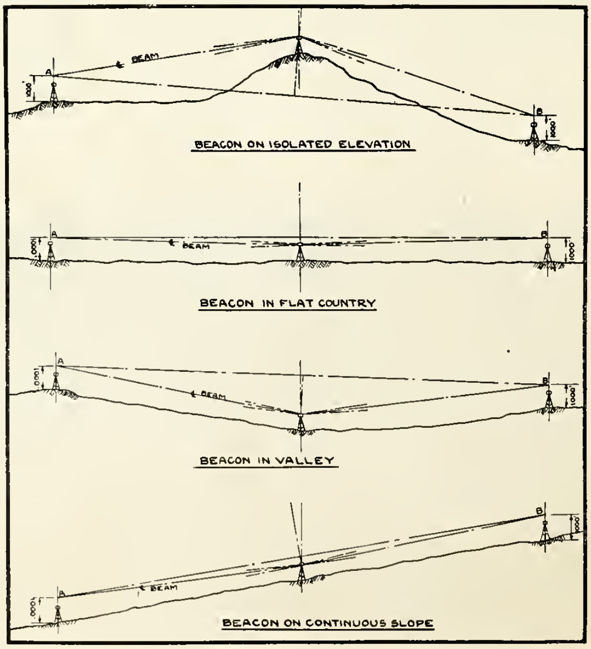
In making landing at intermediate fields, the pilot uses the wing tip floodlights mounted on the airplane and for night flying all airplanes should be so equipped. In addition the airplanes should carry parachute flares to be dropped in the event of a forced emergency landing due to motor failure or other causes, in order that a suitable landing place may be selected by the pilot and the best possible emergency landing made. Fortunately these landings are infrequent, and largely avoidable when adequately powered multi-motored airplanes are used.

At airports, however, a landing field floodlighting system should be provided that will illuminate the landing area to a minimum vertical plane intensity of not less than 0.15 foot candles. There are two methods of installing floodlights at airports. The centralized system has the floodlights grouped in one location. The distributed system uses floodlight units spaced about 250 feet apart along the sides of the airport.

The European practice is to use the distributed system with floodlights mounted close to the ground and illuminating the entire landing area. The advantages claimed is reduction of shadows by directing the light from several sources. The same practice is followed for irregular shaped fields. The glare is eliminated by sharp cut-off using especially designed lamps with small filament heights. Five hundred M.M. dioptric lenses with 3 kilowatt lamps are used.

The usual practice in the United States is to group the lights at one point or along one or more sides in such a manner as to permit the pilot to look out one side of the cockpit in landing without facing the floodlights.

This system concentrates all the glare in one location and the pilot is careful not to look into the light source when he is making a landing. Two types of floodlighting equipment are used for landing field lights, the dioptric lens system and the reflector system. The dioptric lens system is made in three sizes, 1000 M.M. diameter using the high intensity arc or 10 kilowatt incandescent lamp for centralized installation, 500 M.M. diameter lens for the grouped or distributed system using at least two units with 10 kilowatt lamps and small 200 or 300 M.M. units installed along the boundary of the landing area about 250 feet apart and using 1500 watt lamps. There are several types of equipment designed on the reflector system. A common type is the 24-inch parabolic unit with 3 kilowatt incandescent lamps and used for either the centralized or distributed system. Another type is the twin airport floodlight using 2 to 10 kilowatt lamps in two reflectors and the parabolinear light hav-



Method of setting axes of acetylene route beacons.

ing a number of 3 kilowatt lamps in the line of focal points. The parabocylindric floodlight units are made in sizes to accommodate 5 kilowatt, 3 kilowatt and 1500-watt lamps and are used for the distributed system, or the units may be grouped in the centralized system of floodlighting. About 15 to 24 kilowatts are required to produce the required minimum vertical plane intensity of illumination of 0.15 foot candles on a landing field 2,500 feet square. The lamps used may be incandescent or arc lamps. The system to be installed at the airport and the type of apparatus depends upon local conditions, and a special study of each airport should be made to arrive at the best solution. The color of ground, slope and character of surface, shape of field, obstructions, prevailing winds and best runways have a bearing on the proper selection of floodlighting equipment.

An assortment of various types of lighting equipment on display at a flying field.

Radio Direction

Airways lighting consists of rotating beacons and course lights spaced 10 miles apart along the route with lighted intermediate fields at 30 mile spacing. As much as the pilot appreciates this remarkable system of lighting, it is ineffective in fog. The moment the coolness of a cloud bank enfolds him, he is blind and lost unless some unseen hand is stretched forth to guide him. In a rolling sea of blinding vapor, radio direction keeps him on his course. The antenna system of the radio beacon consists of two directional loops supported on a pole. In the small building at the foot of the pole a transmitter is located. It transmits a characteristic signal from equivalent loops alternately in a character that interlocks, marking a radio course by interlocking dashes. There are four courses, each approximately three degrees in width ranging from the radio beacon and these can be shifted by means of the goniometer to coincide with the lighted airway. A simple receiver aboard the airplane with ear phones fitted in the helmet enables the pilot to hear the aural signal from the beacon.

The conventional pattern of the directional radio beacon range is used at Cleveland to mark east and west courses of the Transcontinental from Cleveland. At Bellefonte the pattern has been warped by use of a vertical antenna in conjunction with each directional loop and the radio course is bent at the beacon to mark the axis of the lighted airway. At Hadley Field, the strength of the signal from one of the loops was cut down by resistance and the pattern and interlock altered to radio mark the courses leading to Washington and Hartford in addition to the Transcontinental Airway.

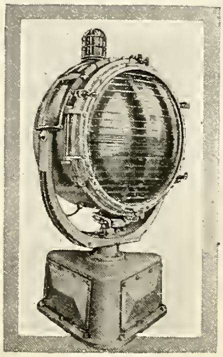
The pilot follows the radio marked course over the lighted airway and is on his course when he hears a continuous stream of long dashes. Should he drift off the course, the pilot loses the signal from one of the loops and hears the dot-dash or dash-dot characteristic of beacon and pulls back on to the course. The pilot is thus enabled to fly blindly through the storm-tossed atmosphere high above the fog enveloped earth if he knows with certainty that a definite distance ahead there are clear skies or that a safe landing can be made.

Weather and Communications

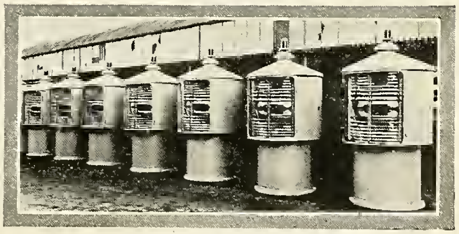
A system of broadcasting hourly weather and landing conditions at principal fields along the route has been started on the Transcontinental between Cleveland and New York. Caretakers at the intermediate fields and the airports along the route transmit reports on the teletype system each hour, and this data is broadcast, followed by the Weather Bureau digest of conditions along the route. This system is being extended to San Francisco and to other airways as soon as the Airways Radio Stations can be completed. The radio broadcast reports make it possible for the pilot to be kept advised as to changing weather and landing conditions along the route and at his terminal airport. Other messages necessary for the safety of airplanes in flight will be transmitted from the chain of Airways Radio Stations.

The Weather Bureau is the responsible agency for interpreting weather reports and making weather forecasts, but substantial coöperative assistance can be rendered to provide the timely weather information required for flying. Data collected at airports is most

Group reflector lights set in concrete.



C-H rotating beacon.



Large type Pintash floodlights.

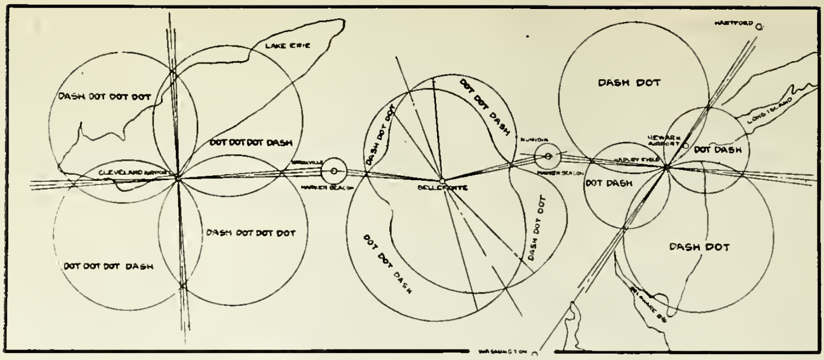


Diagram showing operating range of beacons on New York-Cleveland course.

valuable. A limited appropriation available July 1, 1929, makes it possible to provide, for the first time in the United States, adequate weather service gathered every three hours through a secondary net system. The weather data for the secondary net is telegraphed to Weather Bureau control centers where weather maps are prepared and forecasts covering the geographic area made and transmitted over the Department of Commerce communications system and broadcast by the Airways Radio Stations. All airports within several miles of any airways radio station may tune in on the station and receive weather forecasts, visibility and ceiling height information for all points in their geographic area.

To be included in the secondary net reports may be considered an exceptional opportunity by any airport, since the data furnished is made available to all other airports in the geographical area by the radio broadcast system. The operations manager of the airport may, under this plan be appointed special weather Bureau representative at one dollar per year and the messages will be sent by telegraph at Government rates. Reports from about 200 to 300 airports in the United States are required in the three hour secondary net system to prepare proper forecasts. In addition, reports will also be required from other airports covering ceiling and visibility data when landing conditions are hazardous. This data will be broadcast from the Airways Radio Stations each hour. Pilots in flight and all other airports in the geographic area will receive the radio broadcast of weather and landing conditions. This is an inexpensive method of participating in a system of adequate weather information for safe flying. Areas of fog and storm may be fully charted from the data submitted and the weather hazards taken out of air transportation.

A modern type of airway radio station.

The telegraph companies have promised full coöperation in the handling of fast communications from airports. The restricted radio spectrum does not permit the establishment of airport radio stations for point and interfield communications and land lines must be used.

Communications with airplanes in flight can only be accomplished by radio and in the future all landing and take-off orders will be given by the operations manager of the airport by radio. An exclusive frequency will be set up for this purpose and all pilots will be required to tune in on this frequency when landing, taxiing on the field or taking off from the airport. The airport transmitter will be of low power and range so regulated as not to interfere with other airports.

In addition to weather reports, the Department of Commerce will broadcast each hour such messages to airplanes in flight as may be found necessary for safety of flight. The ground stations of the Department of Commerce will stand a watch, on the assigned calling and distress frequency, for emergency calls from airplanes in flight. Where the communication service rendered by the Department of Commerce is inadequate or non-existent, air transport companies may establish radio stations in which all companies may participate, sharing equal service, costs and liability. Exclusive radio frequencies will be assigned to established civil airways, on which this radio service will operate, to communicate with airplanes in flight. This service is not available for point to point communications.

Any airplane equipped with a simple receiver will be able to receive radio direction, weather broadcasts, emergency messages and airport landing directions. A wind driven generator makes it unnecessary to carry "A" and "B" batteries aboard the plane, but on the other hand, cannot receive when on the ground. Future regulations will require all airplanes carrying passengers in interstate traffic to have a receiving set in proper operating condition. Airplanes carrying more than 6 persons will be required by regulations to carry a radio transmitter for emergency communications over the route. Under the present policy, airplanes with radio transmitters may communicate with the air transport companies' radio stations when flying an established route and when approaching or flying over an airport may communicate at close range with the airport manager on the exclusive frequency set up for this purpose.

This system when fully established overcomes the present great obstacle to commercial efficiency of aviation. It will never be possible to turn aside the destructive onslaughts of storms, nor will we be likely to dissolve the blinding fog, but every airport and airplane within the reach of the Airways Radio network may know every hour what weather conditions are at all points of the compass and at any distance beyond the immediate horizon. Accurate knowledge of conditions and an efficient communications system for disseminating this information is the guiding spirit that brings the pilot safely through.

(Paper presented at the Airport Convention, Cleveland, Ohio, May, 1929.)

PUTTING THE REVS IN REVOLUTION

By

Cy Caldwell

WELL, folks, I don't know that I ever told you much about my war experiences, about how I sipped my way through France, Belgium, and Germany; and I'm not going to rehash it now. What with Elliott White Springs and Jim Bellah having a sort of corner on all war work, there's no mortal use in my trying to write about a war; they've said everything that possibly could be said on the subject—and Elliott has even said things that were impossible—like the one he wrote about me. But it was a good story. However, this article isn't really about a war, though the Mexicans call it one. I mean this latest revolution they had down in Mexico. That's how the Consolidated Instrument Company came to invent the tachometer by the way—they had to get something to count the darn things.

Now that this last one has fizzled, I can let you six readers in on a whole lot of dirt that would have been censored before. I was in that revolution—that is to say, I didn't do hardly any fighting, but I at least did as much as any Mexican. I didn't have to work myself into a sweat to do that much. But I may as well tell this thing just like it happened, right from the start.

You know, I've always liked wars. I quite enjoyed the big one. And when peace broke out I was so pugnacious that I got married and went right along scrapping. Like Al Smith, I was a happy warrior; and I still work at it. If I got the promotion I deserve for long service I'd be a general in the Married Men's Corps right now. As it is, Mrs. Cy rates as about a Colonel and I'm still a corporal.

Well, last month I'd just got through the dishes and finished up the last of my housework while the dear helper was out taking flying instruction at Hal Dungan's school. And I had sat down on the sofa and was sort of resting and wondering if I shouldn't start darning the socks or sewing on a few buttons, when in came Major Bill Long of Dallas, Texas.

"What are you doing?" says Bill.

"Nothing," I said.

"Then what do you say to taking a hand in the Mexican revolution? They're paying pilots $125 a day, and all found," says Bill.

"That war," I told him, "would be a vacation. When do we start?"

"Right now," says Bill. "Get your hat. All you need to work in a revolution is a hat to keep the sun out of your eyes—and at that you're one hat ahead of half our army. Some of them haven't even got a pair of pants. And only high officers have boots."

I got my tooth brush, to show the Mexicans as a curiosity, and started for the war. Bill was telling me how somebody down in Dallas had been outfitting the Mexicans with aircraft. This bird sold them some oversize tires, and the Supply Department wired back that the only thing wrong was that they had no oversize wheels to put the tires on. So this kind dealer sold them $5,000 worth of over-size wheels to fit the over-size tires, which made everything all right, only for the sad fact that the wheels wouldn't fit the axles, which just goes to show what an Americano can do a Mexicano if he gives his mind free play.

I'll pass briefly over our flight down the coast because everybody knows how to get to Mexico, and if everyone doesn't know, it doesn't matter anyhow. The only thing worth mentioning is the effect this war had on the Navy. You should have seen the Navy! There were quite a flock of planes going down, and they had a very disturbing effect on our old seamen. They didn't know clearly what was going on, but they figured there were some fiendish doings somewhere, so they were busy putting their old battleships up on shore where they couldn't be sunk. They might have holes knocked in them, but at least they wouldn't sink. That was a consolation. The Hudson was packed with them; the Potomac was crowded; and Hampton roads was lined solidly with ancient sea hacks. Most of the crews were ashore, for added safety, and the New York Subway System, I read in the papers, was packed to the doors with old admirals seeking shelter in case of bombing raids. These old boys were just riding back and forth from Van Cortlandt to Brooklyn, and sending junior officers up to peek out every now and then and listen for explosions. It was good practice for them in the next war, and they all enjoyed it. One especially old battleship happened to blow up all by itself—I believe a batch of new beer had gone haywire. And would you believe it, before the fragments had fallen back to the water, there was Charlie Levine bidding on the junk? He's quite a business head, is Charlie.

The airplane Bill and I took down was was of Martin's M O's. With a good tail wind we got to Mexico in two weeks. We'd have saved time by putting the thing on a tramp steamer, but we were out to break the endurance record for patience in the air. The beauty of that plane was that we didn't have to pay much for it, for it had been aging in the wood at Hampton—that is to say, it had been just sitting in the hangar growing old enough so that Navy could throw it away and buy a Vought. They gave it to us for $8.96, and I want to say right here that they owe me $8.00.

We had started first, but we were the last to arrive in Mexico. The revolution had been on so long that all the army had worked up callouses on their bare feet. But nobody had got hurt yet, so I saw the thing was going along on standard lines. Two rebel generals had already sent their wives across the border with part of the treasury, and that was standard, too.

But what a surprise Bill and I got! Do you know that half of America's aviation seemed to have got to Mexico? The first I saw was Carl Egge, of the National Air Pilots' Association. Carl was selling memberships to the peons—and Bill and I had been wrestling with Glenn's airplane so long that we looked like a couple of peons ourselves. Carl started right in to sell us; and he might have done it, too, only I had presence of mind enough to say, "No spik Inglish," and escaped. Dudley Steele was at the same work for the Professional Pilots' Association, and going strong. He was telling the peons all about the Pollyanna Tea Shop, as an inducement to join. It seems they were to get meals at half price.

Herb Shearer and Bob Loutt, of Kendall Oil were bidding on oil concessions, carrying pilots around in taxis, and running a refreshment counter in the Hidalgo Hotel. The rebel generals spent three

(*Continued on page 272*)

AERO DIGEST

Published Monthly
THE AERONAUTICAL DIGEST PUBLISHING CORPORATION
220 WEST 42nd STREET
NEW YORK

Vol. 14 JUNE, 1929 No. 6

THE EYE WITNESS

AIRCRAFT accidents continue to be misunderstood by those with no knowledge of the dynamics of flight. The layman usually regards a crash as the inevitable result of flying. This disposition is understandable, for the human mind has a faculty for distorting facts,—it exaggerates or bases its conclusions upon predetermined and stereotyped notions. This tendency is evident when some unexpected event occurs. The inconsistent and ever changing stories told by witnesses in criminal cases are typical of the muddled thinking which arises from such situations.

There are, however, a few men in certain fields who have so trained their powers of observation that they are able to draw accurate conclusions after having briefly observed the circumstances. Such men are usually wise enough, however, to confine their conclusions to those subjects alone in which they are trained. In most cases, these persons are most conspicuous by their rarity.

Even if a mishap, crash or crack-up happens on or near a flying field with several aeronautical men near by, it is often the story of the man who was hoeing a garden across the road which is related in the newspaper. He is upheld as an "eye witness," and his misconstrued conception of what took place is accepted by the public. Those who, by virtue of their knowledge of flying, could tell the true circumstances are disregarded or are mentioned briefly as having made some inconsequential remarks about the accident.

Perhaps this condition arises from the reluctance of those in the industry to augment the excitement by making too precipitous statements. They prefer to wait until they have investigated facts. Such a theory is wise, except that by the time an investigation is concluded public interest has disappeared and the so-called eye witness' story is authentic as far as the layman is concerned. It is better that some one who really knows should make a hasty statement than that an incompetent witness should express for publication the exaggerations of his bewildered memory.

ENGLISH AIR ENTERPRISE

WE are too often inclined to regard the English as being a little slower than we, but, though they have their own ways of going at things, Englishmen are not lethargic in the air game.

Here, there and everywhere in the United Kingdom appears a poster showing a big Scotsman weighing in his hand a letter addressed and stamped to go to India by Air Mail, while he remarks: "It's a bonny six penworth." When Scotsmen have been taught to use Air Mail then its real commercial value may be admitted to have been fully demonstrated.

The British postoffice now takes letters the whole 5,000 miles to Karachi in seven days, and will carry passengers. This means that provision has been made for the quick movement of officials in moments of unexpected crisis. The London to Karachi service has already proved a boon to Egypt.

The development of civil flying, as it is being done in England, in Canada, in Australia, New Zealand and elsewhere in the Empire, is something for America to watch and purloin good ideas from. Even *Punch,* England's staidest comic weekly, carries advertisements of civilian aircraft, showing that the market is considered general.

Nor is Britain neglecting dirigibles. The vast R-100 and R-101 are being pushed as rapidly as possible with the thought that they may save the Empire from the need of asking the permission of foreign powers geographically intervening between London and the Empire's outposts to make airplane bases on their territory.

FOKKER AND GENERAL MOTORS

THE economically sound management of Western Air Express under Harris Hanshue's guidance has been mentioned several times in our columns. When Mr. Hanshue was joined by James Talbot, chairman of the board of Richfield Oil, we predicted that this association would mean big things for the reorganized Fokker company. Now General Motors takes 400,000 shares of Fokker stock.

This is important—it is an assurance of the very things, the big things, which we foretold.

When the board of General Motors authorizes an expenditure of many millions along a line of action new to it, it is an assurance that that line of action has "arrived" in the fullest sense of the word. That the Dupont, Raskob and Sloane type of mind has gone in for aviation is sufficient proof that the big things of the recent past will seem like small things in the immediate future.

There is a further detail worthy of wide mention—Captain Eddie Rickenbacker will be brought back into the industry in an important capacity by this development. He will head the sales division of this great new organization.

INSURANCE HIJACKING

WHEN the National Board of Fire Underwriters, as represented by Mr. H. M. Newell at a Department of Commerce conference, indicated that a proposal to impose upon the aircraft industry a requirement that all hangars having a floor area in excess of ten thousand square feet must be equipped with automatic sprinklers, a protest was instantly and properly forthcoming. The men who signed that protest were Brooks Parker, Casey Jones, W. W. LePage, Donald Bartlett, Ralph Higgins, T. T. Hildebrandt, E. E. Aldrin and J. P. Murray, representing virtually every aeronautical company affected by the proposal.

That the National Board of Fire Underwriters should endeavor to force upon a new industry any such new regulation as that suggested, in the interest of the pocketbooks of a very and a not important few, is a surprising circumstance. Should the industry decide to insure its own hangars and planes, it is close to being strong enough to do so. Then the National Board of Fire Underwriters and their associated insurance companies would be left sitting on the observation benches of the landing field, watching what might have been their business go up into the air in charge of other pilots.

INTRODUCING COMMERCIAL AVIATION IN THE YUKON

By R. N. Miller

FLYING an American open-cockpit plane in temperatures frequently forty below, over rough, uninhabited country in which a forced landing spells slow, painful death, two young Yankee pilots are making air travel a commonplace in the sub-arctic Yukon territory of Canada.

Clyde G. Wann, late of Arkansas, and John M. Patterson, late of Colorado, operations manager and chief pilot, respectively, for the Yukon Airways and Exploration Company, Ltd., have maintained a fairly regular air mail and passenger service (even in dead winter) between their base at Whitehorse and Dawson, four hundred miles away. Four hours is usually required to fly over the desolate stretch, whereas a caterpillar tractor requires 12 to 14 days between towns, and a dog team even more.

Last fall Wann and Patterson flew the first commercial airplane (a Whirlwind-powered Eaglerock) to reach the rugged vicinity of Whitehorse from the United States under its own power. Wann has written a detailed account of the flight and a description of the Yukon company's novel methods of combating the frigid winter climate.

A significant feature of the 4,000-mile flight is that the Eaglerock paid for itself on its way to Whitehorse. En route up the Pacific coast, the pair stopped at every likely town. At many the natives had never seen an airplane. The entire population of some centers turned out to inspect the plane, and a rushing passenger business followed. According to Wann, his passenger receipts from the time he left Vancouver, B. C., until his arrival at Whitehorse, amounted to $6,700, or slightly more than the cost of the plane. The ship stood up admirably under the severe trip, in which it flew 18,000 miles, carried 1,500 passengers, and made over 800 landings.

Flying up the coast, Patterson and Wann frequently were forced to wire ahead for information on the available landing fields. At Prince George, Hazelton and Whitehorse they used fields prepared for the New York-to-Nome fliers in 1920. At Hazelton the pair graded a 1,700-foot runway before attempting to take off with a heavy load of gasoline and supplies. At other towns the airmen used grain and hay fields, measured and marked according to their telegraphic orders.

The longest hop, from Hazelton to Telegraph Creek, carried the pair over 320 miles of some of the most rugged country in North America. Since no accurate maps of the territory were available, they navigated by the hit-or-miss landmark method. It was six degrees below zero when they finally landed at Telegraph Creek.

The fliers left Colorado Springs early in September while the National Air Races were still in progress at Los Angeles. Landing at Salt Lake City on the first morning out, they were surprised to find a large welcoming committee swarm around and extend the joyful hand. The large letters on the plane, required on all Canadian craft, had led the crowd to mistake them for one of the Canada-to-California racers due that day at the Utah capital.

After leaving Vancouver they flew passengers at Chilliwack, Kamloops, Vernon, Kelowna, Penticton, Williams Lake, Quesnel, Prince George, Vanderhoof, Burns Lake, Smithers, Hazelton, Telegraph Creek, Atlin and Carcross.

The entire trip was free from mishaps with the exception of two broken wheels, caused when Pilot Patterson was forced to groundloop on landing in a small, rough field.

The Eaglerock at Telegraph Creek, British Columbia.

Operating aircraft in the sub-arctic regions is not as tough as might be imagined, according to Wann. He has flown the company's Eaglerock at temperatures as low as 42 below, without discomfort to pilot or passengers. Heavy flying suits, face masks and fur-lined helmets break the frigid propeller blast.

Until it can build a big one, the young company is depending on small "motor hangers." Each night the plane is drawn up to a small building near the headquarters, sheltering no more than the motor. A canvas fits snugly around the cowling behind the motor, and a hot air pipe is extended from the jacket around the stove to a point under the carbureter. On extremely cold days, a blow torch is used to force hot air through the pipe. Heated air warms the gas, and the motor starts easily. It is closely cowled in to a point just below the spark plugs. Oil lines are wrapped with asbestos wicking, shellacked and taped. The oil tank is covered with asbestos and even the cowling louvres are covered.

At first, when the pilot throttled down to land, his motor cooled so fast that not infrequently it cut out completely. Special carbureter cowling remedied this trouble.

Barnstorming continues to be one of the company's chief sources of revenue. The inhabitants are hardy souls who enjoy flying and usually are able to pay for long rides. One Sunday afternoon recently at Penticton, trade grew so rushing that Pat made eleven "ten-minute" hops in one hour. The crowd had its enthusiasm up, and as Wann explains, "We tried not to keep them waiting longer than necessary."

The company has contracted to fly a number of trappers and prospectors to isolated spots in the rich, unexplored Mayo-Keno district. The Eaglerock will land them on a lake in the heart of the region, fully equipped for a summer's expedition. The adventurers ordinarily would mush throughout a greater part of the season before reaching their scene of operations.

Few places in the world are so well suited for aerial development as the northern part of Canada, Wann declares. The few planes in the country are awakening the populace to the fact. Despite the relatively small population and long distances between towns, there is not a corresponding lack of money nor interest in aviation. The thousands of lakes make first rate landing fields in both winter and summer.

For a great many years vast areas in the northern part of our continent have remained comparatively unproductive, mainly because of the difficulties in reaching isolated regions of virgin wealth . Throughout Canada and in Alaska aviation is rapidly overcoming those natural barriers which have blocked man's penetration into the north country. Here the business of flying is finding another field of important usefulness.

Because of their inaccessibility, many thousands of square miles remain untrapped, unexplored and unprospected. Airplanes alone can make this isolated territory productive of its great untouched wealth in furs and minerals.

PNEUMATIC TUBES TO EXPEDITE AIR MAIL DELIVERIES

By Hamilton Wright

SINCE the very inception of air mail service in the United States, the problem of the location of airports and its effect upon the speedy delivery and dispatch of mails at terminal points has persisted as a contradictory note in the entire scheme. Even though aeronautical engineers continue to design faster mail planes and in spite of the commendable work of the Department of Commerce in developing the nation's airways, the whole air mail system suffers because airports are generally situated too far from populace centers. It has been aptly said that the greater the speed of any medium of transportation the greater the necessity that its terminals be close to actual destinations. Railroad stations, for instance, must be closer to hotels and business districts than ship piers; and, likewise, airports ought properly to be located even better than railroad depots. Yet because of the essential characteristics of the airplane and because of the concentrated manner in which our cities have grown up, it may never be desirable to have our principal airline terminals in the heart of metropolitan areas.

Nevertheless, this problem does not entirely defy solution. Many suggestions have been offered which might prove feasible. Some of these possible solutions apply solely to the more rapid transit of passengers from cities to airports; others deal only with expediting the delivery of mails; still others seek to solve both problems at once. In this discussion, we shall confine ourselves to what is perhaps the most plausible method of handling air mail on the ground; i.e., by the use of pneumatic tubes.

Assistant Postmaster General Irving Glover recently informed the Congressional Airport Commission for the District of Columbia that the day is not far distant in the development of air mail service when postoffices will be connected with landing fields by pneumatic tubes for the speedier handling of mail to be carried by air. Similarly, First Assistant Postmaster General J. H. Bartlett, stated last year: "With the fine effort that is being made to eliminate time and space by distant air flights, to be consistent, some effort would seem to be justified to eliminate long delays within the city itself. Tubes appear to be the only agency in sight looking toward such progress, not tubes to be installed promiscuously without regard, but scientifically where mathematical and financial computation proves their usefulness."

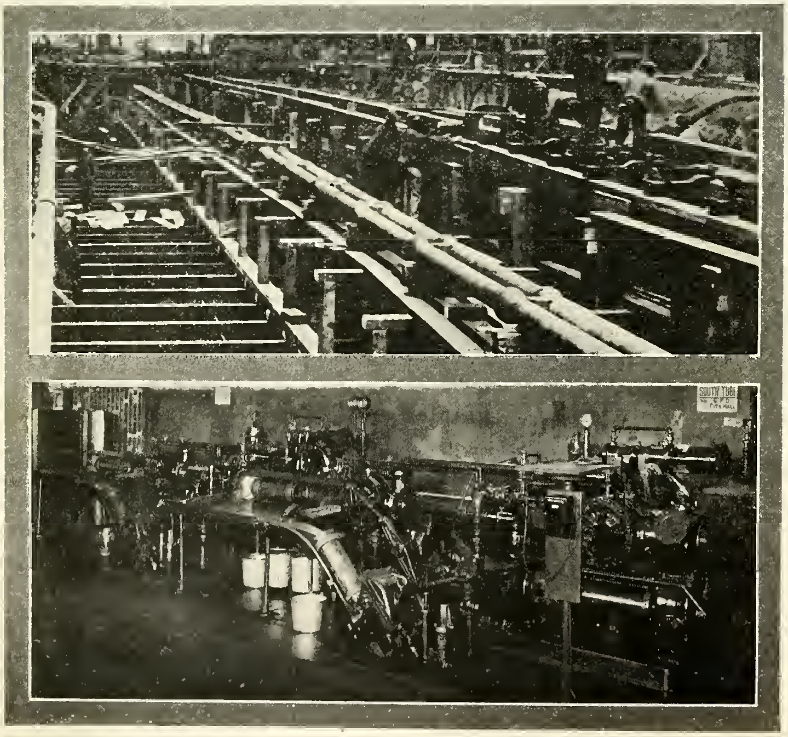
The pneumatic mail tube, it is pointed out, already carries millions of letters daily in some of the principal cities of the world, and carrying mail at high speed, it is particularly suitable for the swift air mail wherever it has been established. It is especially valuable in this era of street congestion since it operates underground. Indeed, many experts predict that in future cities all commercial vehicles will proceed underground by subterranean streets, and freight and express matter will be carried underground by tubes, relieving the surface streets of all transport save that of individuals and lighter motor vehicles. Large corporations will probably some day employ their own planes for the carriage of important mail, checks, and other documents and will, it is predicted, establish tubular service to shoot the mail at high speed directly from the airports into their own office buildings.

In New York City, the tubular post, unknown to the average Manhattanite, travels over 140,000 carrier miles per day (equal to a journey daily of 5⅔ times around the world), connecting the sub-stations and main postoffice and even running across the Brooklyn Bridge. It gives a service that last year was ranked as 99.9661 per cent perfect.

Although its method of operation is but little known by the general public, the tubular post has been conducted underground both in America and Europe for many years, and it still remains the most rapid efficient system for the speedy distribution of mail within large cities.

It is not affected by the surface congestion, and however great the turmoil there, industry, finance, and business receive their mail speedily and on time. The service has been established for more than forty years in Berlin, where the rapidity with which a letter goes from one side to another of so large a city is always a source of amaze-

(Continued on page 246)



Above: Laying pneumatic mail tubes under the street; below: Machinery for shooting mail out of one of New York's postal sub-stations.

AIR—HOT AND OTHERWISE

Watch Bingham
Back Up James
What! Battleships Again
The Chamber Improves

By Frank A. Tichenor

ON March 4th the House of Representatives passed a resolution creating a joint committee directed to make a full investigation of the whole broad subject of control of aircraft in its use for seacoast defense. For a proposition of this sort to be made to the House of Representatives by clever management during the closing hours of a session has not been unusual and later investigations of manipulation of this kind usually have proved to have behind them as the reason for the furtive methods motives not wholly admirable. The bill which is slipped in when few are looking and when nobody has time for careful study almost always is the bill which has a trick in it. Such efforts therefore justify our being very, very watchful. Therefore we have been studying that joint committee.

Not only the subject matter of the bill but the identity of its sponsors seem to justify our vivid curiosity. The sponsor, one Bingham of Connecticut, is one of those American citizens away from whom the people of this nation can scarcely afford to turn their eyes. Various individual human characteristics demand eternal mental vigilance upon the part of the often too unsuspecting majority. It was Red Riding Hood's over-trustful disposition that got her into trouble with the wolf. "What a wonderful set of teeth you have, dear Senator Bingham!" the Army Air Corps often has exclaimed while contemplating this Connecticut lawmaker, its friend, merely wondering who his dentist might be who could make so marvellous a plateful and never dreaming that the smiling Senator, if he spoke really frankly, would reply: "The better to eat you up with, my ex-darling . . ."

When Bingham first was honored by a place in our great upper house (if you don't believe it's great, ask President Hoover) he was ballyhooed as an expert in military aeronautics who, having been himself in the flying service during the World War, would not only understand but undertake. But we have watched Bingham with unceasing care, which, having begun in admiration, proceeds now in mild dismay, and our careful and impartial analysis of the said Bingham is that as the Army's friend he has served the Navy well.

Senator Bingham was taken from the Military Affairs Committee of the Senate early in the present session (which was no national disaster) and given a place upon Finance, for the Big Business of his State felt that it was waste to leave him where his job was merely to develop means of national defense at a time when his gigantic talents might find a more congenial field in the endeavor to jack up the tariff upon wooden nutmegs and other of his State's natural products.

That would have been a fine thing for the Army and the Air Corps had it not been for the circumstance that he remained a member of the joint committee appointed to investigate the use of aircraft for seacoast defense.

The procedure of this group of mental giants is so secret that I may be pinched for mentioning them. The hearings are as furtive as the doings of a sorority in a girls' college, or the hidden meetings of a distinguished group of bank burglars planning their next raid. The doors of the committee room are barred and even members, if they try to enter, after a session has begun, must knock and give the password, as if they were patrons of one of Washington's most exclusive speakeasies. We don't know in detail what it is that Bingham is afraid he will be caught at. But we guess—and assure him that his fears are justified. He will be caught at it all right, although it is general talk upon the Hill that, after the Committee meetings end, no report of them will ever be available to anybody.

The resolution which appointed this committee seemed quite harmless, even ordinary. So many do which afterward are proved to be full of dynamite to blow things up, or of that senatorial garlic which *does* make such a smell.

Monday, April 22, the leading editorial in the Washington *Post*, headed "Aircraft in Coast Defense" asserted: "It is reported that the committee is predisposed to recommend that the coast defenses of Hawaii and the Panama Canal be placed under the command of the Navy, with all air forces and military posts and forces answerable to the Naval command."

This long and emphatic double-leaded editorial scarcely would have been written previous to the findings of the committee without consultation with the committee's chairman. That it should have been written at all, as it was, in advance of the hearings, yet giving a forecast of the recommendations to be made after the hearings have been completed, is astonishing. It indicates that the Navy has, or thinks it has, not only the Connecticut Senator, it's own Hi, but low, Jack and the game as well. Why hold any hearings? Why not let Bingham do it all?

Bearing in mind that dear old Bingham was a member of the Military Affairs Committee of the Senate for a nice long time, it now becomes apparent, intelligent Washington observers think, that the sole purpose of this extravagantly secret joint committee is to take the coast defense of the Panama Canal and the Philippines away from the Army, where it so obviously belongs, and give it to the Navy, which as obviously should not have it. That this course would be unwarranted, illogical and improper is wholly clear to anybody whose possession of a real mind to think with gives him understanding of the grim circumstance that our national coast defenses have been devised and are supported at immense expense for the purpose of defending us.

But the sale of wooden nutmegs has ceased to be big business in these pure food days and the effectiveness for scheming of the wooden nutmeg brain gradually is coming to an end in the United States. It is rumored that the plans of Senator Bingham are receiving far less favorable attention from his fellow committeemen than his oblique optimism hoped and that the recommendations to be made will not be those which he and the yo-heave-ho Svengalis who have gypnotized him confidently expected.

Lots of reasons why Americans should continue that fine habit of falling on their marrow bones from time to time to thank the Lord for favors. One is that the members of the joint committee won't be strung by String'em nor will its decision be swung by Swing'em even though the sessions of the body are as secret as they could be if the deeds proposed had from the first been recognized as dark and devious.

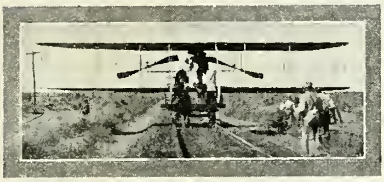
And even if these facts were otherwise, the nation still would find a defense against shrewdness of the psychologically skewed Senator from the State beside the Sound. The House of Representatives cannot be converted into a Naval Affairs Committee at the will of any Senator. Bingham won't be *Bringham*

(Continued on page 232)

PERSONAIRLITIES

by Caldwell

WE hear a lot about famous pilots who beat records from Coast to Coast, but do you remember who was the first pilot to fly from the Pacific to the Atlantic, when he flew, and in or on what? Well, the very first west-to-east non-continuous flight across the continent was made by R. G. "Bob" Fowler, in the year 1911, A. D., on a Wright Model B. You note I don't say "in a Wright Model B." You didn't sit *in* that thing, you sat on it—on the front of the lower wing. I had my first flight in one of those old Wrights in 1915—and I still wonder why I had it. I must have been quite a drinker, even in those days. And likely enough Bob was pretty good at his glass-work, or he never would have flown from Los Angeles to Jacksonville in that thing. You can't make a flight like that simply on determination. He got down in the desert near a railroad and couldn't take off from the cactus-covered sand. So what does he do but perch his old Wright on an ordinary railroad handcar, wait until the wind was blowing straight down the track, and then get the two propellers going and two section men shoving the handcar, and off he went. When the plane and the handcar got up a speed of about 35 miles an hour, the Wright began to lift, and at 36 miles it was flying. The whole flight took 35 days.



Bob Fowler's original air-rail service.

In April 1913, Bob flew a hydroplane across the Isthmus of Panama, completing the first non-stop ocean to ocean flight. His was the first ship to go across the Isthmus. In 1916 he organized the L. W. F. Co. and in 1917 the Fowler Airplane Co. From these two companies Bob made enormous profits—entirely in experience. Since the war, he has done passenger work and is now President and General Manager of the California Air Service of San Francisco.

* * *

THE pilots of the International Air Transport Co. of Brownsville, Texas, carry as unique a cargo and live as interesting lives as any pilots in the world. They are Major Bernard A. Law, Foster B. Jones, Captain Ralph W. Stone, Captain Walter R. Henderson, and A. D. Neimeyer. They fly each morning from Brownsville 160 miles due south to the Sota La Marino River in Mexico, where they land and take aboard from 500 to 1,000 pounds of fish—red fish, pike, and trout—and rush it north to Brownsville, where it is repacked and iced for shipment by train to Houston, Dallas, and San Antonio. These fish are fresh from the warm waters of the Gulf, are chilled and packed in the planes' refrigerators, and arrive at their destination in perfect condition.

The refrigerators are unique. They are large ice boxes constructed of Balsa wood of three-inch thickness. Inside these boxes is placed a small box—about two feet long by ten inches wide—which contains 20 pounds of dry ice, which is enough to keep the temperature of the refrigerator at freezing point. With five planes, a Ryan, a Travel Air, and three Air Kings, these pilots transport 4,000 pounds of fish each day; and are increasing this to 10,000 pounds a day. More ships will be added to the run to carry oysters, which will be opened and transported in sealed three-gallon cans.

Major Law writes: "From the time we cross the Rio Grande River until we land at the base 160 miles away, all we see are wild deer, leopard cats and lions strolling about, herds of untamed Mexican steers, and coyotes. Perhaps once a week we see a lone Mexican on a two by four cow pony making about four miles an hour along the trail skirting the Gulf. Flying over the same route daily grows monotonous; so once each week most of the pilots fly back to Mexico about sundown, and after a scratched-up meal prepared by a one-eyed Chinese cook, they amble out three miles from camp and return in a few hours with a deer, a lion, a leopard cat or a flock of birds—white wings, Blue Rocks, or wild turkey. There are all kinds of birds, including the chattering parrots. One of the biggest kicks we get out of this detail is to be forced down about nightfall, and have to wait about twenty hours to be picked up. The only thing to do is to climb up on the top wing and go to sleep; for on account of the rattlesnakes and wild animals, it isn't well to sleep on the ground."

Fishermen F. B. Jones and B. A. Law

The thrills aren't enjoyed solely by the pilots. The Mexican fishermen have their own problems that are sufficiently complex to break the monotony. Law remarks: "The fish are caught in large seines about 2,500 feet long, handled by a crew of eight Mexicans, who catch some 1,500 pounds of fish in five hours. There is a great battle every time the nets are hauled in—a battle to fight off the man-eating sharks, death-dealing sting rays weighing over 100 pounds each, and the fighting tarpon, the gamest fish in the Gulf. One of these tarpon, weighing about a hundred pounds, rammed one of the fishermen yesterday and broke three ribs. There are plenty of thrills in this part of the world." Yes, indeed I think I shall confine my fishing to the New York Aquarium. You may find me standing patiently beside one of the smaller goldfish bowls.

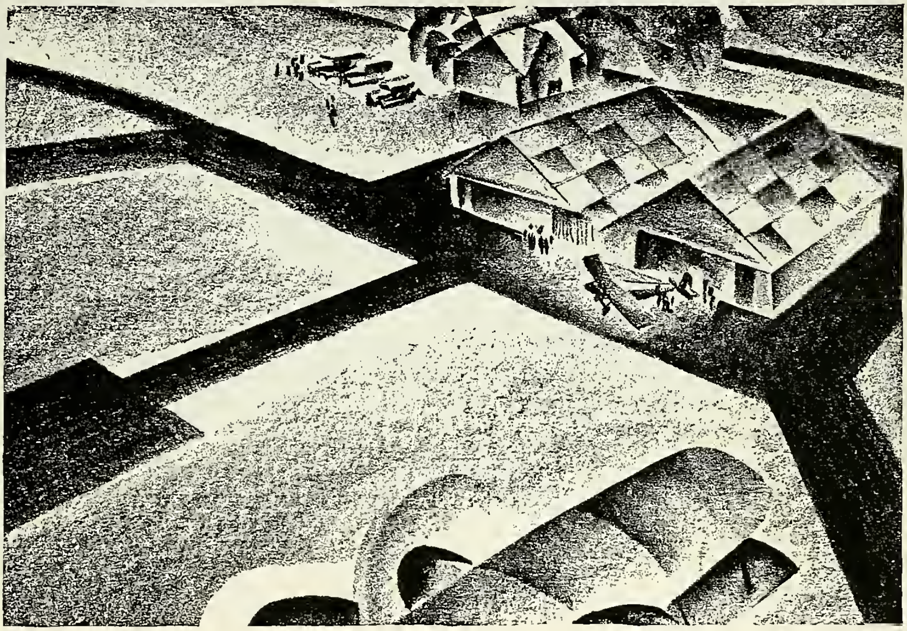
* * *

E. THAYER TODD of the Engineering Section of the Department of Commerce is one of those hard-working gentry who examine the new production ships and pass them for approved type certificates—or tell the designer to hack out that piece and put in this one. When Todd gives a new airplane a hard uncompromising look, the designer trembles in his shoes and begins to wonder if, after all, he forgot something. If the designer forgot it, Todd will remember it. My old friend, J. Don Alexander, says of him: "His efficiency is a splendid example of the coöperation of the Department of Commerce for the betterment of the aircraft industry." Todd had just passed J. Don's new center section

E. T. Todd

(*Continued on next page*)

SMOOTH, all-weather service roads—
Easy to build and easy to pay for



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(PersonAIRlities Continued)

Eaglerock at that time, so naturally the old boy felt like saying a few kind words.

Todd learned to fly in the early days of the war at Call Field, Wichita Falls, Texas, was sent overseas and graduated as a pursuit pilot from the 3rd A. I. C. at Issoudun, France. After the war he re-entered Stanford University and completed his engineering course. Then he was employed on the designing staff of the Ford Motor Co. and later became co-designer of the Thaden all-metal airplane in San Francisco, also acting as consulting engineer among the West Coast manufacturers.

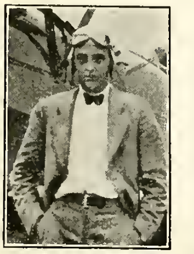
* * *

WALTER A. HAMILTON, Vice President in charge of operations and one of the founders of the Aero Corporation of California, is an engineer of note and a genius in the difficult art of putting motors into the pink of condition. Through his ability in that line, he has built up one of the best equipped motor shops in Southern California, on the Aero Corporation Field, where seventeen licensed motor men are constantly busy overhauling airplane motors that come in from all parts of the Southwest and the West Coast. He's a member of that interesting race which has given to the world its two greatest sports—golf and Scotch whisky. Of course, when I say the Scotch "gave" these things to the world, I'm speaking figuratively. I've often wondered why the Scotchmen gave up wearing kilts and took to pants; until a tailor mentioned that less material is required in pants. Now I'm wondering why the Scotch wore kilts in the first place. Hamilton's uncle lives in Aberdeen. He's getting a trifle nearsighted, and wears glasses. Lately he's got into the habit of looking over the rims to keep from wearing out the lenses.

W. A. Hamilton

* * *

TRUMAN WADLOW, holder of Transport Pilot License 1,755, is field manager for the N. A. T. at St. Joseph, Mo., and in his spare time runs the Wadlow Flying Service and sells Travel Air planes. He has had over 600 hours of flying and has flown all over the West. His best achievement is probably the delivery of a ship from Billings, Montana, to Boston, with six dead stick landings and not a single scratch on the ship. He has been in aviation for five years—and he has just passed his twenty-first birthday. He has certainly got away to a good start. He celebrated his birthday by selling a Whirlwind Travel Air—the fifth ship he has sold in ten months. He owes his success in life to the fact that he started work at the age of 16 in Walter Beech's factory in Wichita. Gazing at Walter day after day proved to be in inspiration to the lad, and he determined to go Onward and Upward, doing Bigger and Better Things.



Truman Wadlow

* * *

OUT in the state where the tall corn grows—Iowa, to wit—in the hamlet, village, or town called Ames, there toils from daylight to dark one Wilford Gerbracht, distributor of Travel Air planes. The early bird, hopefully opening its eyes at dawn to peer about for the early — and slightly dumb—worm (for why should a worm get up at all?) finds the diligent Wilford already at work preparing his plane for the arduous labor of the day. These labors consist of instructing the young idea how to leap into the air, and thereafter land on all three points. Wilford has been at this hard business for a year or more, which perhaps accounts for the slightly puzzled expression you may observe upon his face. He's wondering if it is really worthwhile to wear out an OX-5 and his own patience on the current crop of corn-fed Iowa embryonic airmen. However, one must live, even if only in Iowa, so Wilford goes at the work with good will toward all and malice toward none. And when an instructor can feel that way about a pupil you may write him down as having an exceptionally kind and even affectionate disposition.

W. B. Gerbracht

Gerbracht learned to fly with Earl Rowland, in 1926, when Earl was working for my old friend Walter Beech, main support of the cold canned tomato industry. (If you want Walter to land a neat jolt on your jaw, just ask him what I mean by that crack!) Anyhow, Walter awarded Gerbracht the distributorship of Travel Airs for Iowa; and the busy instructor has sold nine planes in 1928. In his spare time he flew an OX job to California and back, started in the Class A race from New York to Los Angeles, and got as far as Harrisburg, Pa., when a broken intake valve forced him out of the race—and back to instructing. He soloed five former farmers in 1928, and is working on a second crop. In other words, Wilford is providing some real farm relief. He's teaching the boys to fly, and thus is relieving them of the necessity of following the ponies and a disc plow. And what, I ask, could afford greater relief to a young farmer?

* * *

FOLKS, meet E. B. Cole, Inc., of 140 Cole Court, Peoria, Ill. It's a pleasure to have a whole Corporation embodied in one man—he's a sort of one-man street-car of aviation, I imagine. Mr. Cole, Inc., was with the dear old Navy at Key West during the war, where he learned to fly such dainty craft as the N-9, the H-16, and the nimble HS2-L. To this early training in heavier-than air—and likewise heavier-than-lead — aircraft, brother Cole, Inc., owes his ability to pilot a 5-ton Mack Truck with one hand. In fact, during the war there was some talk of transferring him to the Tank Corps, only they discovered that his flying the H-16 had made him too heavy-handed to pilot a Tank.

E. B. Cole

In 1921 he tells me, a local undertaker bought a plane—possibly with the thought of aiding his business—and had Cole fly it on floats and the Illinois River, a stream somewhat resembling the Chicago Drainage Canal. Thereafter Cole spent all his waking hours patching floats and dodging bridges with such deft movements that the undertaker was fooled—he never got Cole cold. By this time Cole was so desperate that he tried to get a commission from the Army Reserves—but since the Army refused to recognize his Naval training as being of any help to him in the flying of airplanes, Cole was out of luck until 1927, when he tied up with Eaglerock as dealer for Central Illinois with Jack Oates. He signs himself, "Yours for a Bigger and Better Potato Chip." If you mean it, Cole, move to Idaho.

* * *

WHENEVER anyone goes to work for J. Don Alexander, the man who always signs himself, "yours with a smile," he instantly feels that he has to bust right out in a grin. Look at Michael J. McInaney, for instance, Sales Manager of the Alexander Film Company. That's just one picture, but I have photos of that whole Alexander bunch, and everyone of the birds is simply laughing his head off. It must be the light air, or the big pay, or something. Cloyd Clevenger said it must be the air; he couldn't think of any other reason. But good old Michael J. is simply laughing because he's Sales Manager of the Film Branch. And any man who can sell those films has a right to laugh; so has the purchaser, if he has the strength for it. Mike only learned to fly a year ago, but since then he has made most of his sales promotion trips by air. He says it saves him time. Even with an OX-5, Mike? Drop in, Mike, and I'll tell *you* one.

M. J. McInaney

* * *

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MEMBER OF AERONAUTICAL CHAMBER OF COMMERCE

AIR COLLEGES FOR TRANSPORT PILOTS

By

T. J. C. Martyn

ALL who have witnessed the tremendous growth of aviation in this country must have felt great pride in the profound admiration for the achievements. And yet, despite the continuing acceleration of output, it seems that the full tide of progress has hardly set in. The main trunk airways have now been well established. With the dawn of 1930 a network of regular passenger services will be in operation across the continent either by air-rail or by air alone. With the passing of time these trunk airlines will broaden out, and it may be only a matter of a few years before there will be an hourly plane service leaving New York. The development of these airways will depend to a large extent on the organization of feeder lines—services that will carry passengers from intermediate and outlying centers to the air termini. Our network of airlines may indeed become close meshed and cover every state in the Union. Prophecy is both difficult and dangerous, as well as thankless, but however much or however little passenger service may be developed, it seems safe to say that in a few years most of the mails will be taken out of the hands of the railroad companies and carried by air. It is inconceivable that anybody will send a letter or a package by rail when it will be able to go more swiftly, as safely and as cheaply by plane.

What this great prospective development will mean in pilots can only be remotely guessed at. Is it too much to suppose that in a comparatively short time we shall have one hundred thousand planes in daily operation? I think not, eventually. This means that we shall need more than one hundred thousand duly qualified and experienced pilot-navigators. What steps are we taking to train these men? At present there are a few—far too few—good schools giving excellent flying instruction. A great many are chiefly interested in turning out pilots with private licenses. Few are giving that intensified instruction that alone can qualify a student pilot for transport work. Such training is indeed beyond the scope of an ordinary school. The law prescribes a minimum of two hundred flying hours before a student can obtain a transport license; but the consensus among transport companies is that a pilot is not much good for transport work until he has done five hundred hours flying. Some companies require a minimum of 2,000 hours. How is the ordinary man to obtain this experience? If he is rich his way will be easy. He can buy a plane, or hire one. He can go barnstorming on a plane bought with borrowed money. He may get a job with a transport company, if he is not rich and is a pilot of exceptional promise, doing odd jobs and eventually taking passengers up at an airport for ten-minute "joy hops." But will this give him the experience that will turn him into a seasoned all-round transport pilot? The answer is a categorical no. It is far more than a question of putting in a certain number of hours flying.

Apart from the few good schools, there are a large number of schools that are not so good. There are, of course, some that are downright frauds, but most of them are bad because they lack organization and a properly co-ordinated system of training. Probably some of these schools are concerned more in making money than in turning out adequately trained pilots. And as for giving a student a solid basis on which to build for his transport license, it is equally to be feared that most of these so-called "private pilots," if they intend to qualify for transport work, will have to begin all over again and perhaps unlearn a good many things they have been taught.

There is a real danger in this situation, and as yet there is little indication that it is being met in the proper way. There is a grave danger that the transport companies may be compelled to let up on the high standard of flying personnel they now require, under the pressure of air mail and passenger demand, because there is a danger that the supply of pilots will fall sadly behind the need for them. At the present time there are not enough qualified transport pilots in the country, but the shortage is not yet acute. Since little is being done to train them, it is conceivable that within a year the real pinch for transport pilots will be felt. What then? No use to sit down and trust to science to evolve a fool-proof plane, one that will land by itself and fly by itself. Such a plane, if it is ever perfected, which is doubtful, will still require an expert navigator-pilot, even if radio control fulfills all its dreams. In fact it may be squarely stated that the advance of science will call for men of even greater skill.

The problem of training transport pilots is to make them as airworthy as the planes they fly. It is not merely a matter of five hundred hours of air experience. I have no doubt that in time a higher standard for transport pilots will be laid down by legislation, but this is surely not the happiest way of achieving the desired result. The transport companies themselves are the logical people to set their own standards and maintain them. That each company should have an air college of its own is a manifest impossibility, for they are expensive schools to run and the tuition is largely beyond the purse of the average air student, so that the companies, having a direct interest in securing a source of supply of soundly trained transport material, themselves should be willing to support such a college. With this in mind, I shall describe, very roughly, what I believe the model air college should be, and what I shall have to say will be based on hard and fast experience and deductions drawn out of that experience. It is to be hoped that it will give the student pilot a glimpse of what he has to accomplish before he can hope to be a first class transport pilot; that it will indicate a line of progress to be followed by the transport companies; and that it will add its mite in further reassuring the public of the excellence of our transport pilots by holding out the hope that this high standard will be continued.

The first thing to find out about a student pilot applying for flying instruction with a view to becoming a transport pilot, as has been repeatedly pointed out, is his physical fitness to withstand the strains of flying. The requirements of medical examination are already set forth by the Department of Commerce, and the Department doctors undertake the tests. But mere physical fitness is not the whole battle. Assuming that the prospective flier is physically fit, the instructor will want to know something of the man, his personal habits, dependability, character, etc. It is conceivable that a student might well be trained into an expert flier and that some bad habit would none the less disqualify him for the steady grind of transport flying. The present practice of training pilots is haphazard, to say the least. In many cases, students report irregularly and may or may not have ground instruction. Under such circumstances, it is well nigh impossible to learn much about each student's character and ability. The obvious remedy is to have all students intending to qualify for a transport pilot's license resident on or near the airport of instruction. Only in this way will it be possible to

(*Continued on page 238*)

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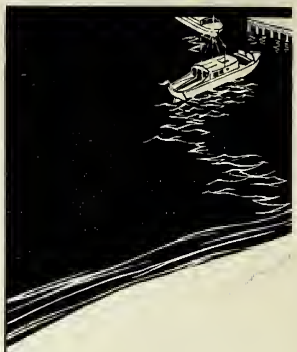

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WITH THE SKY THE LIMIT AND THE WORLD FOR A LANDING

YOUR *next* ship—the Commuter—the new Keystone-Loening four-passenger cabin amphibian—a year round plane for sportsmen and sportswomen who love the air, who like to be free to come and go as they please, alighting at will on land or water.

Go *where* you please. Go *as* you please. Only an amphibian gives you real freedom of the air. Freedom as to destination, route, landing. Freedom of dress—for the trim cabin of the Commuter calls for no special flying togs.

The Commuter is an easy plane to fly, even for a beginner, as your companion at the dual control, next the pilot's seat, will appreciate. Yet, it is swift, safe and above all staunch and sturdy. It is really a small edition of the Keystone-Loening Air Yacht, scion of a proud line of amphibian planes designed and built by Loening, which have seen so much service during the past five years that the type has been named: "The plane that does the hard work for America."

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And, of course, as the name implies, the man who commutes daily or weekly will find in the Keystone-Loening Commuter the comfort, speed

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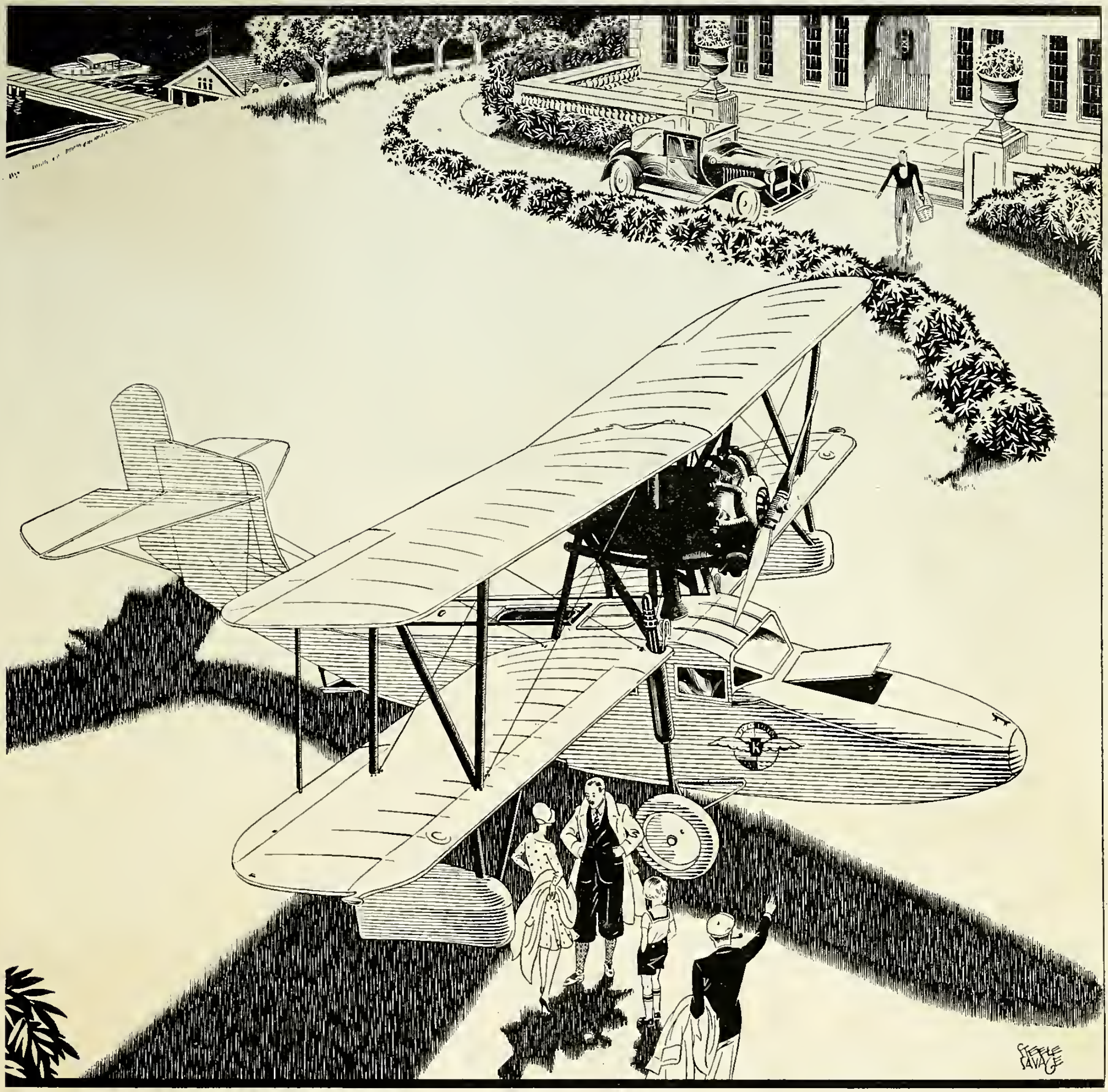

and dependability which make even commuting a genuine pleasure.

Picture the joy of flying such a ship! Into the air in 7 to 10 seconds! Then up a thousand feet a minute! Whither you will, at the speed of the birds, behind the new 300 h. p. Wright Whirlwind. And, at your journey's end, a graceful, easy landing on land or water.

Your plane, riding at ease down the dock, taxied up on the beach, parked on the lawn, or stowed away in your private hangar, awaits your pleasure, beckons you skyward.

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AIRWAY BEACONS

By F. C. Breckenridge

Associate Physicist, Bureau of Standards

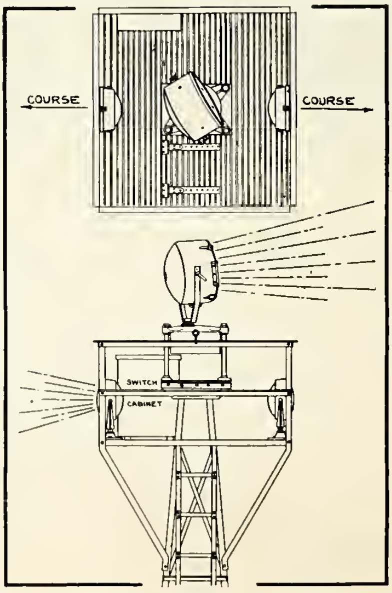
Typical Airway Beacon.

THE ever-growing popularity of the air mail is arousing a considerable interest in airway beacons. The airplane saves time. But, if time is to be saved, the hours of darkness must not be lost. It has, therefore, been apparent from the early days of the air mail that night flying is indispensable to its success, and night flying means lighted beacons to mark the airways.

Most of the beacons thus far established have been erected by the Airways Division of the Bureau of Lighthouses as a part of the comprehensive program of the Department of Commerce for the advancement of civil aeronautics. An increasing number of beacons, however, are being established by private interests. Business organizations and the owners of prominent buildings desiring to promote aviation have erected more than forty beacons during the past two years, while all the more important airports are being equipped with beacons in response to a demand for night-flying equipment.

The announcements describing the establishment of private beacons quite generally lay great stress upon the candlepower, but the scanty reference usually given to some of the other characteristics of the beacons suggests that it is not generally understood that there are several other qualities that are essential to a successful beacon. However, even though the importance of candlepower is usually appreciated, it is doubtful if its true meaning is as generally understood.

Candlepower is not a measure of the quantity of light given by a luminous source. It is rather a measure of the concentration of light in a particular direction. The true measure of the rate at which light is given out by a source is luminous flux, and the unit is the lumen. With ordinary sources of light such as candles, oil lamps, gas mantles, and incandescent lamps, the light goes out in all directions somewhat uniformly and the total lumens given out by any of them are roughly proportional to their candlepowers as usually measured. In such cases the candlepower does give some idea of the light produced by the lamp.



Tower with revolving and fixed course lights.

The case of a beacon is altogether different. After light has passed through a lens or has been concentrated by a reflector, the candlepower in different directions will vary all the way from zero to the maximum candlepower of the beacon which may amount to millions of candles. It is this maximum candlepower that is customarily quoted, and its value gives no indication at all of the total lumens in the beam.

It is important that a beacon have a high maximum candlepower, for otherwise the light will be quickly absorbed and scattered by haze so that it cannot be seen at any great distance. There are, however, at least five other characteristics that should receive attention along with the candlepower in selecting beacons; namely, flash length, flash interval, vertical spread, color and an identifying characteristic.

The flash length of a rotating beacon depends upon the horizontal beam spread and speed of rotation. If the flash length is excessively short, the effect upon the eye is exactly the same as a reduction in candlepower. Even if the flash length is not so short as to amount to such a reduction in the observed candlepower, it may still be so short as to lessen materially the pilot's chances of picking up the beacon at a distance. The experience of the Lighthouse Service has shown that three-tenths of a second is the minimum practical flash length for marine beacons. Even this is considered undesirable, and relatively few beacons are given a flash length of less than five-tenths of a second. Because of the great demands upon the attention of airplane pilots, a long flash is even more desirable in an aeronautical beacon than in a marine beacon.

The flash length of a rotating beacon may be increased by increasing the horizontal beam spread. If this is done and at the same time the candlepower values are not decreased, the luminous flux must be increased, which generally means the use of more power in the lamp. Another method of increasing the flash length of a rotating beacon is to slow down the speed of rotation. This course, however, results in increasing the interval between flashes which is also objectionable.. The airway beacons of the Department of Commerce rotate six times per minute, giving an interval between flashes of 10 seconds. This is thought by many to be undesirably long, but the introduction of the course light as an accompanying auxiliary has been an improvement in this respect.

The vertical spread of the light from an airway beacon is important because the beacon is generally seen from an angle well above the horizon. This is particularly true in hazy weather. In good weather a pilot flying towards a powerful beacon may pick up its beam twenty, thirty or more miles away. At a distance of about five miles, depending upon the altitude of the plane, the pilot passes above the main beam. When the atmosphere is clear, however, the stray light (light coming directly from the beacon but with a lower intensity than that in the main beam) is still sufficient to guide the aviator to within

(Continued on page 230)

AIRPORT AND AIRWAY

News of airlines, airports, and airways; radio, lighting and other auxiliary services

By
Edgar H. Felix

Applying Common Sense to Airport Site Selection

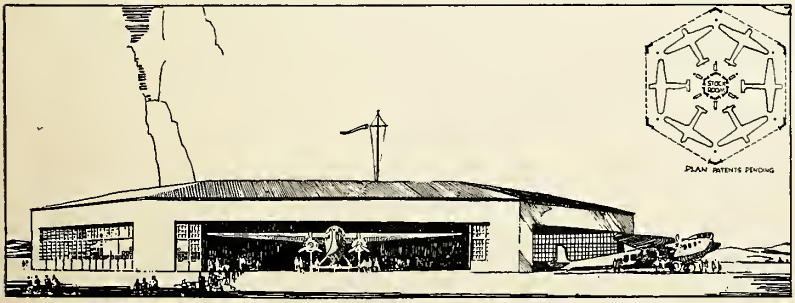
FROM several directions, echoes of political battles waged over the selection of airport sites rumble ominously. Lost causes and failing parties are being resurrected under the banner of service to aviation and, in some cases, suspicion that the private pockets of politicians may be benefited under the guise of supporting the best available airport site is not unjustified. Self-styled experts are testifying in behalf of one group or another before commissions whose members do not know what it is all about.

There have been so many instances of wise and far sighted planning that we must regret any misguided efforts or political controversies in the name of aviation. The selection of an airport is an engineering problem, not a political one. If there is one place that politicians are not needed, it is in the selection of an airport site. The only factor of which they have any understanding is accessibility. They measure the value of an airport in minutes automobile trip from City Hall, presumably so that they will be the least inconvenienced when attending the dedication ceremonies. But if accessibility is placed above competent engineering recommendation, then accessibility to a spacious graveyard should be made next in importance. Such factors as meteorological conditions and drainage shortcomings, for example, are difficult, if not impossible, to alter, but accessibility can be radically improved by express highways and rapid transit extensions.

The first question and perhaps the most fundamental one is determination whether a safe and adequate airport can be built on the site under consideration. This question should not be answered by securing the casual opinion of an aviator on a fair day after a prolonged drought, but upon a systematic appraisal of landing conditions for the entire twenty-four hours and for all the seasons of the year. A Sunday afternoon, fair weather opinion may obtain a satisfactory judgment to the potential size, surface hardness and absence of obstructions under the particular conditions obtaining on that day, but that same field, observed at sunset on a weekday winter afternoon, may be badly obscured by smoke and of such poor surface that no amount of drainage engineering could salvage it.

From time to time, we have called attention to well considered processes of airport selection employed by various cities. Sites selected by competent air transport companies are almost always studied with considerable care and frequently municipal commissions employ competent help in their airport problems. In this connection, the experience of the City of San Francisco in passing judgment on a single factor, meteorological condition, is an example.

The city fathers were confronted by conflicting arguments in behalf of six different sites. Debate centered upon the relative meteorological superiority of the various sites. Instead of relying upon biased opinions, it was decided to enlist the aid of the Weather Bureau to make an exhaustive meteorological survey of the various sites. This survey is described in detail in a paper by Ernest E. Eklund, appearing in the January, 1929, issue of the *Monthly Weather Review*. Both instrumental and non-instrumental observations were taken for a period of months at each site, covering fog, precipitation, and sunshine duration, frequency of dense fogs, character of fog distribution, visibility, wind direction (tabulated hourly), sudden changes in wind direction, a continuous record of wind velocity, of gustiness, and of maximum fluctuations in wind velocity, and the facts regarding turbulence in air movements having marked vertical components. After gathering all this exhaustive data, it was conclusively proved that one of the sites suggested had markedly better meteorological characteristics than all the others. This example indicates the thorough-going way in which data on but one of the many factors constituting airport desirability may be collected by scientifically trained observers. With facts like these upon which to base judgment, the best interests of the community and of aviation are served.



Architect's sketch of the Western Air Express aircraft service roundhouse.

Giant Aircraft Roundhouse New Departure in Hangar Construction

IN designing the new Los Angeles service hangar for Western Air Express, C. C. Cole, superintendent of operations for the air transport company, and W. Y. Eaves of the Eaves Construction Company, evolved an entirely new and highly practical architectural plan. The hangar is hexagonal with six doors, each 126 feet wide. Six giant planes with an average wing spread of 100 feet may be serviced simultaneously. Advantages of the unique construction are conservation of space, protection against fire hazard and greatly simplified handling of planes. The six enormous doors are controlled by electricity and can be opened within thirty seconds. The cement floor is dipped toward the doors and all six planes can be removed from the building within a minute. Mechanics, working on motors, will have the convenience of a runway suspended from the ceiling, which may be instantly hoisted out of the way.

Western Air Express is also building an operations hangar at its Los Angeles airport, 420 feet long and 85 feet deep. It will be capable of housing 30 large ships. Machine shops and a passenger depot will be provided. The main runway at the airport is to be 500 feet wide and 3,400 feet long. The east and west runway is to be 500 by 2,600 feet and the north and south runway 300 by 2,700 feet. Complete equipment for night flying will be provided. It is expected that the new airport will be ready for use about June 1, or about the time that the Western Air Express establishes its passenger lines between Los Angeles and Kansas City. Trimotor, 12-passenger Fokker monoplanes of the F-10 type will be utilized.

Airport Developments

THE Curtiss Flying Service has purchased a 438-acre tract near Glenview, a suburb of Chicago. Thirty minutes from the Loop by train and 45 minutes by automobile highway, the field is a short distance from Evanston, Willmette and Winetka. The company will conduct long distance and cross-country air transportation, local taxi service, aerial photography service, aircraft distribution and service, and both primary and advanced student training. One large division of 300 acres will be used entirely for commercial operations, and an adjoining and separate field of 130 acres will be devoted solely to student training. The immediate construction program calls for an expenditure of $250,000. The real estate involved in the site is valued at three quarters of a million dollars.

By the purchase of a 270-acre tract at Valley Stream, L. I., Curtiss Flying Ser-

(*Continued on next page*)

(Continued from preceding page)

vice solves its New York airport problem. It had been considering the Barren Island site, but transportation inconvenience militated against its selection. The purchase of a 300-acre tract near Raleigh, N. C., has also been announced.

NEW YORK AIR TERMINALS, INC., organized to develop the Secaucus air centre in the Hackensack meadows, and which recently acquired Hadley Field, will also build seaplane bases at North Beach, Queens, at Black Tom near Communipaw, and along the North River, Manhattan, if possible, between Sixteenth and One Hundredth Streets. Another airport project being launched by the company is a 200-acre terminal at Croton Point in Westchester County.

REBUKING the Dock Department for having granted a temporary permit for the use of the waterfront at West Seventy-Ninth Street, New York City, as an airplane landing place, Mayor James J. Walker revoked the three permits which had heen issued to Colonial Airways, Curtiss Flying Service and the Coastal Airways System. Residents along Riverside Drive have offered strenuous objections to the granting of these permits.

PORT COLUMBUS at Columbus, Ohio, the eastern air terminal of Transcontinental Air Transport, will be the first airport to be equipped with the new 3,000,000 candlepower floodlights developed by the General Electric Company and already recently described in these columns in some detail. The floodlight consists of eight high-power incandescent lamps arranged in a row in front of half a dozen cylindrical mirrors which spread the light over the field at a level low enough not to blind the pilot landing directly into the beam. The lamps, especially designed for aviation purposes, operate on 32-volt circuits and use 3,000 watts each, making a total load of 24 kilowatts.

A 20-foot combination blinker tower and penthouse, built by the International Derrick and Equipment Company of Columbus, has also been installed at the field. This tower is fire, lightning, rust and corrosion proof and is constructed to resist high winds and storms. An interesting feature of the blinker light is the so-called sun valve which operates automatically; darkness opens the valve and supplies the burner with gas, and, when daylight returns, the valve closes and the light goes out. A sufficient supply of gas is stored to cover six months' service.

RAPID progress is being made in the construction of the new Akron, Ohio, municipal airport, located three and a half miles southeast of the city. It will cover 700 acres when completed about January 1930. A temporary landing field at one end is now being actively used by the Continental Air Lines, flying between Cleveland and Louisville. The Goodyear Zeppelin is erecting its enormous hangar at one end of the port, where two 6,500,000-cubic-foot Zeppelins are to be constructed. The dirt moving and levelling of the field is being carried out by Cable Brothers of Canton, Ohio. The illustration shows a Galion motor grader and Galion master roller at work on the field. The airport is managed by B. E. Fulton and the construction work is under the direction of Fred E. Swineford, director of public service of the City of Akron, Ohio.

Blinker tower and tank house, built by International Derrick & Equip. Co.

A NEW Curtiss interest, the Curtiss Airports Corporation, was recently formed as a Delaware corporation, with C. M. Keys, chairman of the board, and Walter S. Marvin, president of the new corporation. The new company is to open airports in 16 cities, establishing a chain across the country, and to engage in the operation, management and development of national airports.

With the Air Passenger Lines

A CLOSE working agreement between the aviation Corporation of the Americas, which owns Pan American Airways, and United Aircraft and Air Transportation Corporation of which Boeing Air Transport and Pacific Air Transport are subsidaries, has been effected by Richard F. Hoyt by the purchase of a substantial block of stock in the first named corporation. This deal will practically confine the operations of United north of the Mexican border, while the Aviation Corporation of the Americas and its subsidiaries will work south of the border. This involves the transfer of various rights in Mexico from Boeing to United.

THE New York, Rio and Buenos Aires line, a subsidiary of Tri-Motor Safety Airways of New York, has been organized to inaugurate a flying boat service connecting the United States with the east coast of South America and the Munson Steamship Company's vessels which run to South American ports. It is competing with Pan-American-Grace for air mail contracts.

PAN-AMERICAN AIRWAYS, INC., has established a summer round trip tariff at a charge of one and a half times the single fare to eastern points, except for the Miami-Nassau jump which has heen still further reduced to $65 a round trip, as compared with the usual rate of $50 per single trip. All summer round trip tickets must be used within 90 days after the initial flight and return tickets outstanding on November 1 will be void.

PITCAIRN AVIATION has organized an advisory council, composed of leaders of the various cities served by its air mail lines, with a view to securing local coöperation and advice in conducting its services to the best advantage of the community involved. The practical and good-will effects of the idea may be watched with interest by air transport companies.

DURING the first three calendar months of the year, Pan-American Airways transported 3,254 passengers over its international air route to Havana, Nassau and countries of the West Indies. Most of the passengers used the international air-rail service offered by the Atlantic Coast Line, Florida East Coast and six associated companies, including the Pennsylvania and Illinois Central systems which sold through tickets for railroad and air transport to passengers from practically every city in the United States. More than 50 tons of mail were carried and 250,000 miles flown in air mail service.

A COMPUTATION made by the traffic department of the Boeing System reveals that, if a traveler purchased a ticket for a one-way trip over every regularly scheduled airline offering passenger service, he would travel 12,914 miles. For this travel, he would pay $1,427 or eleven cents a mile. The lowest charge per mile is 7.6 cents between Portland and Seattle; the maximum, 21 cents per mile, is for a short over-water hop along the Pacific Coast. This average price for air transportation compares very favorably with railroad mileage because air travel requires no extra pullman or chair car charges or taxi fares to and from terminals, these items heing included in the airplane fares. Airplane travel is three and sometimes four times as fast as train transportation and the mileage is direct and therefore usually less than rail mileage.

IN order to provide aerial commuting service between such points as Newport, Watch Hill, Southampton, Lake George and New York City, the New York and Suburban Air Lines has been organized. The company will take over the business and equipment of the Rogers Air Lines, which have been operating successfully in

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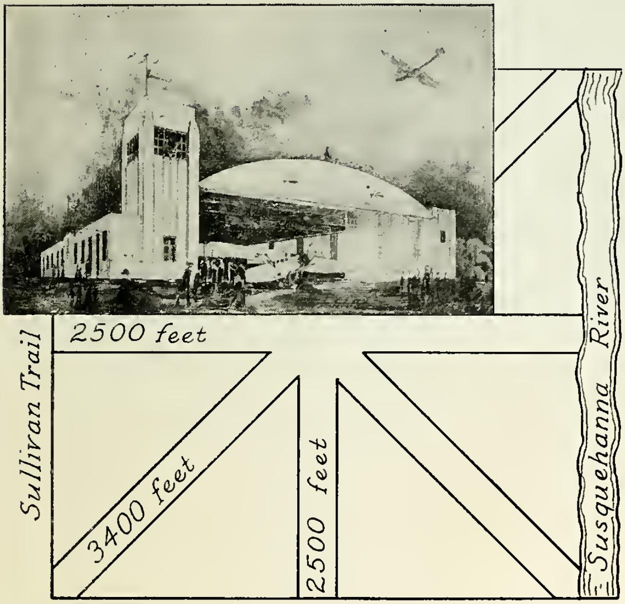
Grand Opening



Wilkes-Barre
Wyoming Valley
Airport

Saturday
June 22, 1929

An invitation to air transport operators, aircraft manufacturers, Government and Chambers of Commerce officials, persons who want to learn flying, and all interested in placing the Wyoming Valley on the air map of America—come to the Grand Opening!

Coming to serve a vital need!

A new model airport for the historic Wyoming Valley of Pennsylvania. It will be completed, with the large modern hangar above, before Saturday, June 22nd . . . the Opening Day.

The Wilkes-Barre Wyoming Valley Airport will have A-1 equipment, servicing and repair facilities—the efficient management of practical flyers of proved business ability. It will be an air terminal for the future as well as now!

Located on the air line between New York and Cleveland, only 4 miles from the business center of Wilkes-Barre, and on the banks of the Susquehanna. Runways over 2500 feet into the prevailing winds and an ideal seaplane landing. 430 feet above sea level, unusually free from fog, no hazards for take-off or landing . . . the flyer's haven in the Alleghenies!

A first class flying school will be conducted under the personal direction of C. A. Herrick, well-known flyer. A new 1-CH300 Bellanca and 2 Warner Travel Airs are available for instruction. Enrollments now being received and classes start June 24th.

Hangar space, space for manufacturers' distributors and rights for taxi and commercial operation are now leasing. *Write for full particulars, also schedule of events, races, entry requirements, and prizes awarded on Grand Opening. C. A. Herrick, General Manager, Chamber of Commerce.*

Wilkes-Barre
Wyoming Valley
Airport

Wyoming Valley

Wilkes-Barre, Pa.

ON THE AIR LINE BETWEEN NEW YORK AND CLEVELAND

(*Continued from preceding page*)

the vicinity and also in Miami for several years. Daniel H. Cox, yacht designer, has been active in organizing the new company. Harry Rogers, formerly president of the Rogers Air Lines, will become vice president of the company in charge of operations. During the winter, the company plans to move south, operating from Miami and Palm Beach.

FOUR round trips will be made daily between Detroit and Cleveland (8:30 a. m., 12:30 p. m., 3 p. m. and 5 p. m.) by the Thompson Aeronautical Corporation flying boat service between those cities. Each plane carries six passengers, pilot, co-pilot and 500 pounds of baggage and mail. The scheduled time for the trip is 65 minutes. Each terminal is within ten minutes of the business center of the city involved.

WITH the inauguration of the new Chicago-St. Louis service via Springfield and Bloomington, Universal Aviation Corporation will be operating two lines between Chicago and St. Louis. At the same time, the St. Louis-Kansas City-Omaha service will begin. Boeing planes with accommodations for four passengers and a liberal mail and express compartment will be used. The new route, being shorter, is to operate on a slightly faster schedule.

Air Mail Tonnage Reaches Record Totals

AN average air mail efficiency of 97.02 per cent has been maintained by the Robertson division of Universal Aviation Corporation since the inauguration of the St. Louis-Chicago air mail route, April 15, 1926, to January 1, 1929, according to statistics recently released. This is the highest percentage, according to H. H. Perkins, president of the Robertson division, of any contract mail route in the country. During the months that the route was in operation in 1926, an efficiency of 97.89 per cent was maintained; during 1927, 96.21; and 1928 rated 96.88. Spring, summer and fall seasons of the year give much higher efficiency ratings, the figures for March to September, 1928, being approximately 99 per cent. Colonel Charles A. Lindbergh was the first air mail pilot to fly the St. Louis-Chicago route and was chief pilot for the Robertson division of Universal Aviation Corporation before he made his transatlantic flight.

THE first year's operations of Pitcairn Aviation's New York-Atlanta air mail resulted in the safe and speedy carriage of nearly 100 tons of mail, aggregating more than 7,800,000 separate pieces of mail of average weight. 405,617 miles were flown in scheduled operation by Pitcairn pilots in that period.

Air Mail

THE New York-Philadelphia shuttle, connecting with the transcontinental route at Hadley Field and operated by Pitcairn Aviation, Inc., has been extended so that Richmond, Washington and Baltimore are given the same feeder service that was heretofore restricted to Philadelphia. The north-bound plane leaves Washington at 6:45 p. m. and arrives at Hadley Field at 9 p. m., connecting with the overnight plane to the middle and far west which leaves there at 9:35 p. m. Fifteen minutes after the morning plane arrives from the west, the Pitcairn plane starts south to Philadelphia and Washington, arriving at the latter point at 7 a. m. in time for the first delivery in all the cities along its route.

PLANNING a seven-day service between New York, Rio de Janeiro and Buenos Aires, Trimotor Safety Airways, Inc., has ordered six Consolidated Commodore 32-passenger flying boats, according to J. E. Reynolds, president of the corporation. The company has an exclusive contract with the Argentinian government to carry mail between that country and the United States for a period of twenty years.

New Devices for Airports and Airways

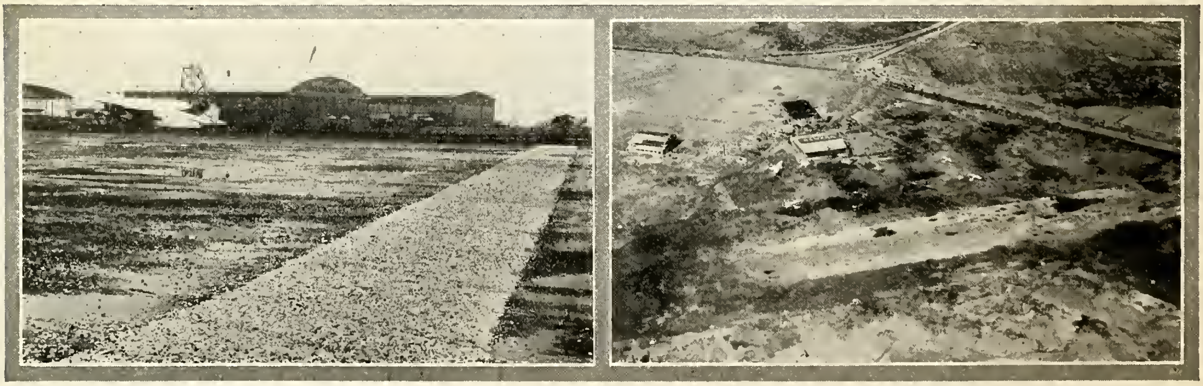
A BULLETIN issued by the General Electric Company, describing the Novalux floodlighting projector, not only describes the uses to which these floodlights may be put and the various types available but gives in convenient tabular form easy means of computing the amount of illumination necessary properly to floodlight every type of building.

CONSIDERABLE engineering information of great value is included in a booklet, "Hangar Design for Airports," issued by the Macomber Steel Company of Canton, Ohio. It describes not only their standardized steel building parts and how they may be utilized in the construction of individually designed hangars, but also presents general relevant information regarding hangar dimensions, illumination, wall materials and their heat resisting properties and hangar hardware.

ROBBINS & MYERS, INC., pioneer manufacturer of electric motors, motor-generator sets and electric fans, has organized a crane and hoist division under the general managership of Frank F. Seaman. The company will build electric and hand-power cranes, hoists and trolleys up to ten-ton capacity.

A MATERIAL being used on an increasing scale for augmenting the permanent visibility of markers, identification marks and runways, is Lime Crest Aviation Spar, pure crystalline white limestone. Its brilliant color is permanent and unchanging, and, when used around field lights or other markers, requires no painting or other maintenance work. It is quarried by the Limestone Products Corporation of America at Newton, N. J., and was first put to use as a result of the observation of pilots flying over Sussex County where it is used for surfacing important highways. Newark Airport is one of the users of Aviation Spar, and it is being used in connection with the Donhart Lights being installed at Roosevelt Field, Long Island.

A NEW style of boundary light has been developed by E. H. Stork, engineer for the city in charge of the Columbus Municipal Airport, and Charles E. Schuler of the International Derrick & Equipment Company. Its advantage is that it may be struck by an airplane without damage to the plane and with little damage to the light itself. When struck, the cone merely tips or collapses. The shape of the base offers little resistance to the wind stress created by the propeller of the plane and the light will not turn over. Furthermore, snow and ice will not stick to its surface.



Left: Runway at Newark Airport marked out with crystalline white lime stone; right: recent aerial photo of Newark Airport.

Fokker Adds Days to Vacations

OUT in the Land of Magnificent Distances, stretching from the Rockies to the Pacific, lies the world's greatest play land. The West, an empire of snow-capped mountain ranges, sunny valleys, vast forests, lakes and trout laden streams, tinted deserts and winding trails, holds everything for which the city-weary might yearn. Eleven great national parks were created to preserve this virgin wilderness forever for the recreationist. ***There was one great obstacle but National Parks Airways overcame that with Fokker air lines.***

The West was too far away from the centers of population for Americans to vacation in this, their rightful recreation heritage. Too many days were needed enroute—days that must be taken from an all-too-short vacation.

National Parks Airways helped change all that. Flying great Fokker planes, built and equipped for every travel luxury, over the wonderland of the Yellowstone and Glacier Park regions. Their Fokkers have added days to many vacations.

Other airways now offering regularly scheduled service, with Fokker comforts, include Universal Air Lines; Texas Air Transport; Standard Air Lines; Western Canada Airways; Dominion Airways; Pan-American Airways; Western Air Express.

Write your name, address and vacation destination in the margin below, send it to the Fokker Travel Bureau, 655 Chamber of Commerce Bldg., Los Angeles, California, with a 5-cent stamp (to pay air mail postage) and let us send you our illustrated booklet, "When Air Travel Pays."

FOKKER AIRCRAFT CORPORATION OF AMERICA

Factories: WHEELING, WEST VIRGINIA, *and* TETERBORO AIRPORT, HASBROUCK HEIGHTS, NEW JERSEY
Address inquiries NEW YORK OFFICE, 110 EAST 42nd STREET

Name..AD

AIRPLANE RADIO TELEPHONE

Fairchild monoplane which has been equipped with radio telephone.

WITH a radio-equipped Fairchild monoplane, engineers of the Bell Telephone Laboratories and the Western Electric Company recently demonstrated the practicability of holding a conversation from the cabin of an airplane in flight with persons having an ordinary office or home telephone. In a recent test calls were put through the flying Fairchild's transmitter for several hours and conversations were held with persons from twenty-five to thirty miles away and in several different telephone exchanges. Various numbers were obtained with regularity and two-way conversation was established between the men flying in the Fairchild and their offices or with other persons. Voices registered well at both ends.

Equipped with sending and receiving apparatus, the mechanics of plane to ground telephony are comparatively simple. Receiving in the air is made possible through high amplification of signals picked up by a four-foot aerial mast and fed into a specially built four-tube receiver at the right of the cabin wall. Three to four times louder signals were received from this set than from the average receiver. Power to run the receiver was provided by a small wind driven generator attached to one of the struts.

Signals were sent from a trailing wire antenna about forty feet long which was let out as the ship ascended. Communication was possible after the ship had attained an altitude of 1,000 feet or more.

A microphone with a rubber covered mouth piece plugged into a small switchboard to the left of the cabin was the means of conveying speech to the station below.

Signals from the plane were picked up at Whippany, New Jersey, where the Bell Telephone Laboratories maintain a testing station and were connected to the telephone wires at that point.

The new receiver is housed in a duralumin case and weighs only twelve pounds. Its over-all dimensions are approximately twelve inches in length, eight inches in height and four inches in thickness. It employs the single dial type of control and is simple to operate.

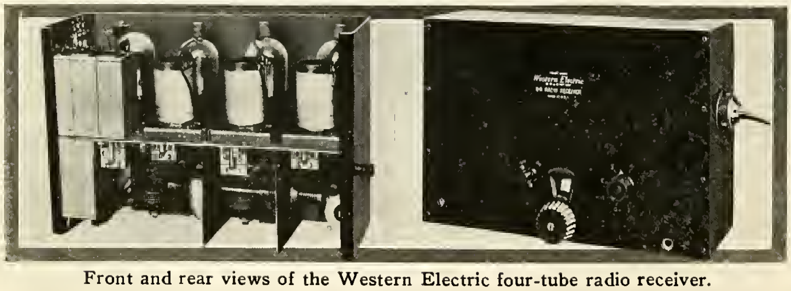
The set consists essentially of four tubes, three of which are of the screened grid type recently perfected and the fourth tube of the three-element heater type. It has two stages of radio frequency amplification, a detector and one stage of audio frequency amplification. Due to the employment of the space-charged grid detector circuit, the set is extremely sensitive. The employment of screened grid tubes gives an amplification of approximately three to one as compared to the former three-element tube.

The set operates from a wind driven generator having a total weight of less than seven pounds. This generator supplies both 10 volts and 220 volts to the receiver. The necessary filters for eliminating objectionable noises are included in the set.

Radio set installed in the Fairchild.

The transmitter has a carrier power of fifty watts but is arranged for 100 per cent modulation so that the peak power output at full modulation is 200 watts. A frequency range of from 1,500 to 6,000 kilocycles is provided (200 to 50 meters), and the operating frequency is maintained to within plus or minus .025 per cent under all conditions. To accomplish this a crystal oscillator of the Western Electric type is used. This is thermostatically controlled to maintain a constant frequency over a temperture range of from forty degrees below zero Fahrenheit to one hundred and twenty degrees above. The complete frequency control equipment weighs less than nine ounces.

Power for the transmitter is obtained from a double voltage direct current generator geared to the airplane engine. Special control is provided to maintain constant voltage automatically at all engine speeds. Eleven hundred volts are taken off for the plate supply and are passed through filters in the transmitter to remove all objectionable noise. The regular airplane battery is floated across the low potential supply of fourteen volts and used for the tube filaments.



Front and rear views of the Western Electric four-tube radio receiver.

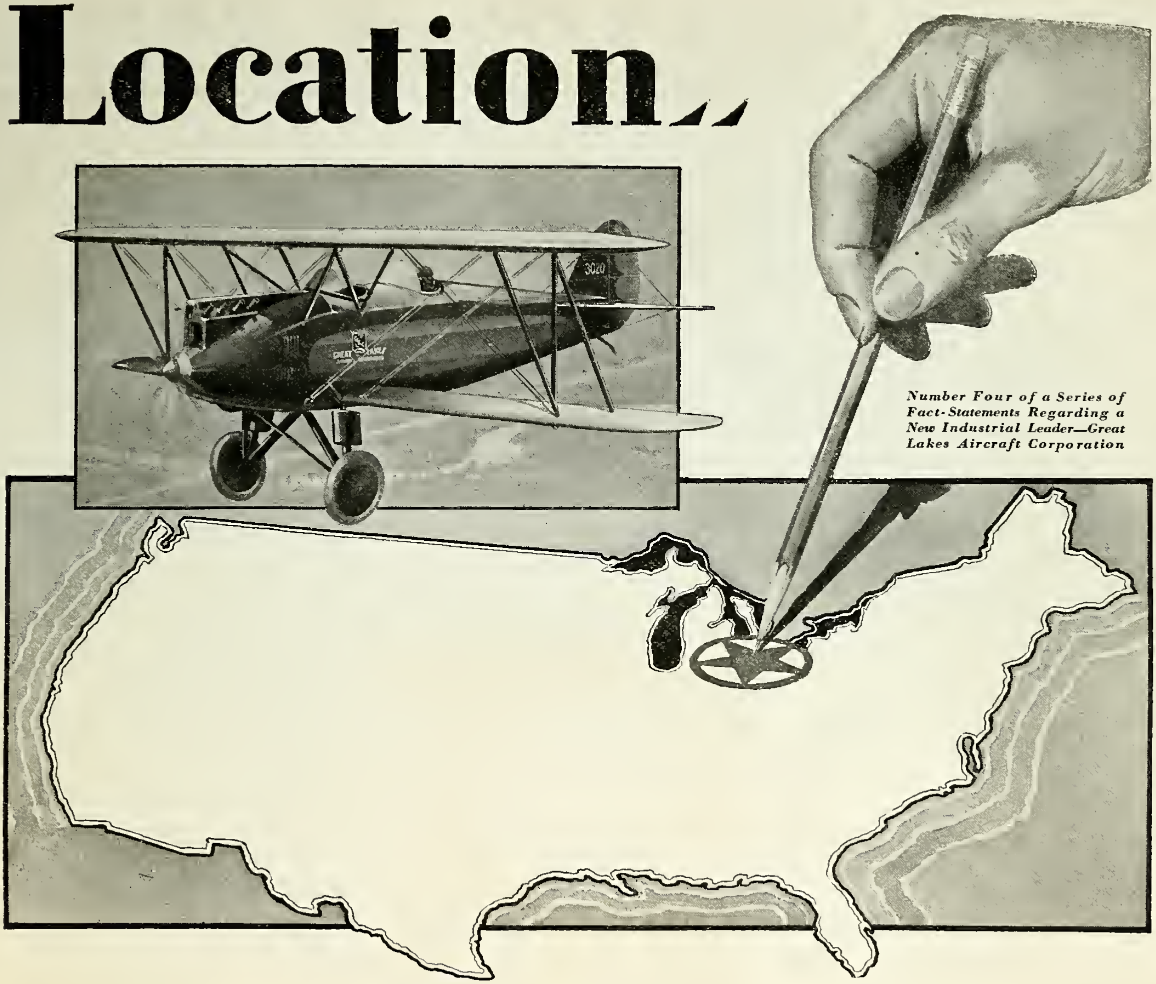
NEW BURGESS "B" BATTERY FOR AIRCRAFT USE

THE Burgess Battery Company of Madison, Wis., has introduced a series of high voltage "B" battery units designed particularly for aircraft use. The cells constituting the battery are assembled in "stick" form, making a long and slender unit, easily and compactly combined to secure considerable voltages for transmission and reception purposes. It is made up in 108 and 144 volt units with sufficient intermediate taps to give an adequate variety of voltages. The dimensions of the larger cell are 15¾ by 3⅜ by 2⅝ and the smaller 14¼ by 3⅛ and 3⅛. In spite of the small size of cell used, the batteries have good shelf life and considerable recuperative power when used for the intermittent service usually encountered in radio telephone and telegraph communication.

T.A.T. TO EQUIP PLANES WITH RADIO TRANSMITTERS

TRANSCONTINENTAL AIR TRANSPORT has been granted licenses for the equipment of 20 planes with aircraft radio transmitters, according to announcement of the Federal Radio Commission.

Location



Number Four of a Series of Fact-Statements Regarding a New Industrial Leader—Great Lakes Aircraft Corporation

TO claim recognition as the "Air Capital of America" has become almost a universal habit among enterprising cities of today. Without wishing to become involved in any controversy, however, Great Lakes Aircraft Corporation is glad in its own behalf and in behalf of its customers to own Cleveland as its home.

Market-wise, we find ourselves at the hub around which revolve eighty percent of North America's commercial and sport activities. The great eastern seaboard and the rich Mississippi and Ohio Valleys are only a few hours away. Boston, New York, Philadelphia, Chicago, St. Louis, Cincinnati, and Detroit are neighbors.

Production-wise, our sources of material and skilled labor lie within easy reach, lowering costs, increasing value. Coal, rubber, glass, steel, gas, aluminum—all the basic materials needed in the manufacture of aircraft are immediately at hand. Shipping facilities by air, rail and water are unexcelled. Distributors and individual purchasers find us easy of access—and prompt of service.

GREAT LAKES GLAC **AIRCRAFT**
CORPORATION CLEVELAND

Military and Commercial Airplanes • Seaplanes and Floats • Aluminum Alloy Parts

FOREIGN NEWS IN BRIEF

Compiled from reports from AERO DIGEST'S correspondents, the Automotive Division and the Transportation Division, Bureau of Foreign and Domestic Commerce

ENGLAND

PLANS were announced for the filling and testing of Great Britain's new $4,000,000 dirigibles, the R-100 and the R-101, late in May. The construction of these two 5,000,000-cubic-foot airships is rapidly nearing completion after delays occasioned by changes in plans and the addition of new devices.

The R-100, the Air Ministry has decided, will go to Canada, while the R-101 will make its first long flight to India and Egypt where arrangements already have been made for handling the ship. The R-101 is being constructed at the Royal Airship Works, Cardington, while the R-100 is being made for the Air Ministry by the Airship Guarantee Company at Howden, York.

England to India Non-Stop

THE English Fairey-Napier monoplane which attempted to set a new long-distance non-stop record flight from England to Bangalore, India, landed at Karachi on April 26 after having flown 4,130 miles in 50 hours, 48 minutes. The ship landed 1,170 miles short of its goal out of fuel, due to unfavorable winds.

The plane which set a record for the first England to India non-stop flight was piloted by Capt. A. G. Jones-Williams and Flight Lieutenant N. H. Jenkins. The machine is a monoplane, having a wing span of 82 feet and a fuselage 50 feet long. The wing varied throughout its span in thickness, chord and incidence. The tail is cantilever, the only external bracing wires on the machine being those to support the fin. The undercarriage is very wide to give stability on the ground. The cabin is totally enclosed.

The engine is a Napier Series XI type, the only alteration from the normal service engine being that the carburetors were tuned for economy and slightly higher compression ratio pistons were fitted. About 1,100 gallons of gasoline were carried in the tanks in the wings of the machine, flowing by gravity to a collector tank under the floor of the cabin whence it was pumped to the engine.

The British Fairey-Napier monoplane which was flown non-stop from England to India.

FRANCE

[PAUL E. LAMARCHE, JR.]

MONSIEUR Le Comte de la Vaulx, the president of the Federation Aeronautique Internationale, recently gave a practical demonstration of the possibilities offered by the French air mail to South America by returning from Buenos Ayres to Paris in nine days. He covered all of the distance on land by the regular mail planes of the Compagnie Generale Aeropostale, crossing the South Atlantic to Dakar in Africa by one of the fast mail steamers that connect with the air mail. From there he flew over the regular air routes along the North of Africa and over the Mediterranean continuing northward to Paris.

TWO notable long distance flights have recently been completed by French fliers, both of whom used the same type of plane, the Farman F-190 monoplane, powered with a Rhone Gnome Titan 250 horsepower engine. The first of these was the *Air Afrique* Mission under the leadership of M. Richard, who with Laloutte and Cordonnier flew from the Toussus-le-Noble Field, near Paris, to Fort Lamy in Africa after crossing the Congo. Their flight over Africa covered a distance of 15,000 kilometres.

The second flight was that of Bailly and Reginensi, who flew from France to Saigon in French Indo-China in ten days, making ten stops. This flight is worthy of note inasmuch as it was a private enterprise and followed the orders of the Air Ministry forbidding any further efforts on the part of the Government to organize such flights.

A NEW naval aircraft carrier, *Le Commandant Teste*, was launched at Bordeaux recently in the presence of Admiral Frochet and other officials. The new boat has been given the name of a French aviator who distinguished himself both as an aviator and an engineer during the war. *Le Commandant Teste* has a total length of 167 meters and a beam of 27 meters and has a total displacement of 11,500 tons. Her speed will be 20 knots and she will carry 26 flying boats with a personnel of 43 officers and 606 under-officers and seamen. The hangar space for the planes will be 84 meters long, 27 meters wide and 8 meters high. The flying boats will be launched by four catapults on the deck and raised at the end of a flight by powerful cranes.

A NEW light plane known as the Delanne two-plane low-wing monoplane has recently been put through its trial flights at the Orly Field, near Paris. This plane was designed by Monsieur Girault and was built by the Etablissements Letord, near Paris. It is powered with a 70 horsepower Anzani motor, though it has also been tried out successfully with a Salmson motor of 65 horsepower. The fuselage is of wood, and the two seats in the cabin are placed side by side.

A NEW two-seater cabin monoplane has been placed on the market by Henri Potez, a well-known French constructor whose plant is located in Meault in the north of France. This new plane, which resembles certain types of American cabin planes in general design, has folding wings and is powered with a 60 horsepower Salmson motor. The two seats in the cabin are arranged side by side.

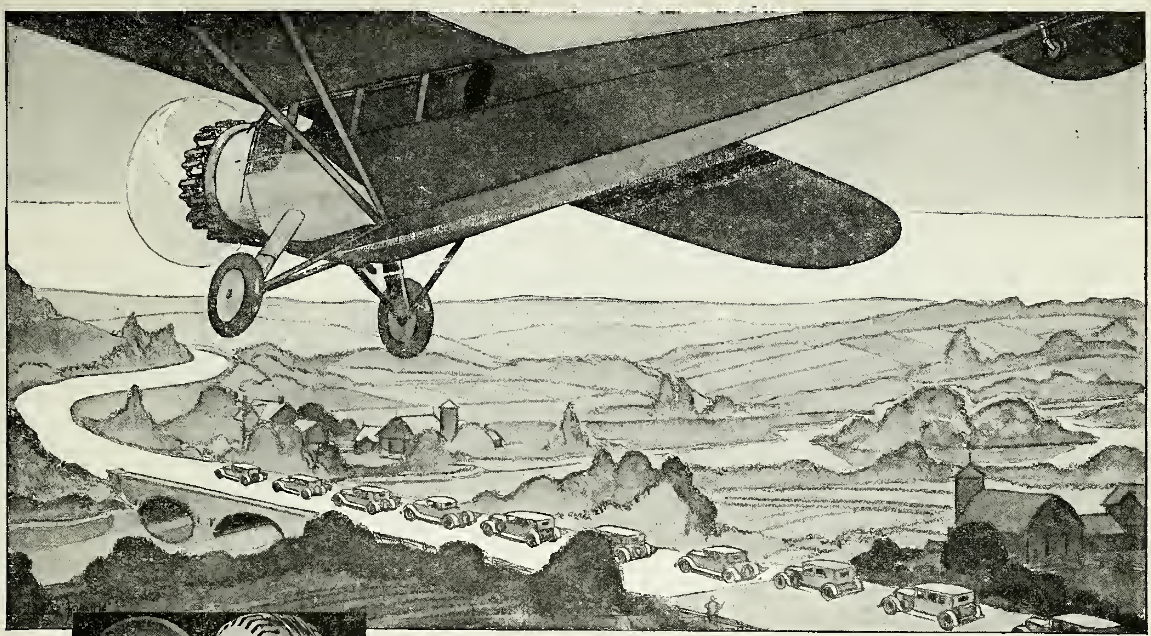
THE twentieth anniversary of Bleriot's crossing of the English Channel by airplane in 1909 will be celebrated at Calais, France, on July 25 by the Aero Club and the Ligue Aeronautique de France. The occasion is to be marked by the issuance of a stamp designed by the president of the Aeronautical Society of the Pas de Calais.

German Airport Development

GERMAN airport development is progressing conservatively and solidly, according to a survey made on landing facilities in that country during the past year. The use of iron and concrete construction in place of wood and the constant efforts to satisfy aesthetic demands mark the trend of growth in this work.

At the close of the survey there were 86 aviation fields for landplanes in the country and 9 for seaplanes. Of these there are 25 classed as "airports" for landplanes, and 4 for seaplanes. The other 66 are classed as "commercial landing fields."

According to specifications, an airport must have a thorough equipment including hangars with heating and lighting plants; underground fuel tanks; a heated factory or workshop in which all ordinary repair work can be done, even at night; a weighing apparatus for planes; a meteorological bureau; a radio station; complete illumination for landing; accommodations for pilots overnight; administration buildings, waiting rooms, and separate rooms for weather service, radio, passport and customs officials, mails, police and first aid stations; water and electric works.



The famous Silvertown airplane tire, twin sister to the illustrious Silvertown automobile tire, tested by years of service, approved by pilots and manufacturers alike.

Fourth Major Aircraft Show Record this year goes to GOODRICH

***GOODRICH** has staked out its field in aviation. The realm of heavier-than-air-craft is its zone of endeavor. There Goodrich has pioneered . . . there Goodrich has helped to write history. And there Goodrich leads with products far advanced for modern flying.*

The B. F. Goodrich Rubber Company, Established 1870, Akron, Ohio. Pacific Goodrich Rubber Company, Los Angeles, Calif. In Canada: Canadian Goodrich Company, Kitchener, Ontario.

MORE Goodrich Silvertown Airplane Tires were displayed by manufacturers on their new model airplanes at the second annual All-American Aircraft Show in Detroit, April 6-14 than any other make of airplane tire!

Two shows . . . two All-American Goodrich records. And the *fourth major-aircraft-show record this year!*

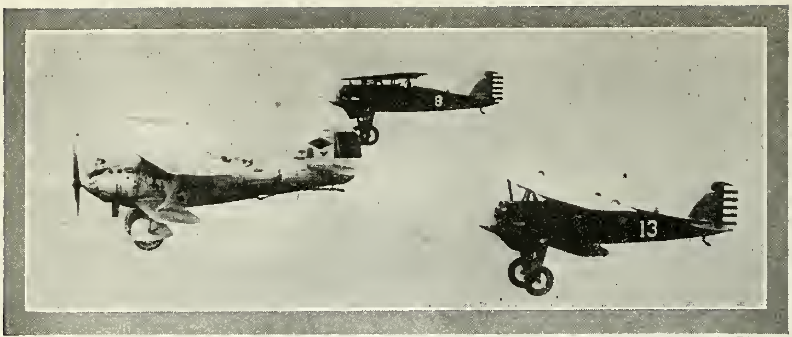
Surely such confidence must be merited, must be founded on fact and based on previous records of Goodrich Silvertown Airplane Tires. And it is!

Goodrich Tires were used by Lindbergh on his famous cross-Atlantic solo flight. By Chamberlin and Levine. Art Goebel, Kingsfort-Smith, Brock and Schlee. And more recently by Captain Hawks on his dawn-to-dusk record-breaking flight.

On land, too, as well as in the air, Goodrich Tires, Silvertown automobile tires, on the famous Silver Fleet, are demonstrating *their* superiority just as convincingly *by actual test.*

Goodrich

Rubber for Airplanes



P. and A. Photo

Army Boeing PW-9 pursuit planes escorting Jiminez and Iglesias, Spanish transatlantic fliers, in their Breguet biplane upon arrival in Panama.

MEXICO

[MONT HURST]

COMMERCIAL companies are doing a great passenger carrying business in various parts of Mexico. The oil and mining regions, along with Mexico City, are furnishing particularly good business for Mexican planes. The Cia. Mexicana de Aviacion ordered quickest possible delivery of twenty-five Ford monoplanes from the Ford Motor Company in Detroit to care for the rapidly increasing business of the company. This concern's lines run from Mexico City and Tampico to Brownsville via Tuxpan. The oil companies, as well as tourists and business men, are using the passenger service extensively. The Cia. Mexicana de Aviacion will shortly establish a passenger line from Mexican points to the Republic of Guatemala. Several more routes are under consideration and some are in the course of preparation now.

IT is expected that the air service of Mexico will grow greatly following the virtual ending of the revolution. Planes have proved their value, and more training of pilots and buying of equipment is expected to follow. The few planes of the federals delivered excellent service in the revolt and played no little part in ending it.

THE Cia. Mexicana de Aviacion recently took delivery of a new Whirlwind Stearman. It was flown from the factory to Brownsville, Texas, and delivered to the pilot who flew it into Mexico. It will be used as a general service plane and will be used especially for carrying payrolls of the oil and mining companies in the Tampico section.

AIRPLANE excursion rates to the United States are offered by the commercial companies of Mexico this season. The special summer rates will be on until September. One may buy a round trip ticket for one and one-half times the regular price of the one-way ticket from the airport where it is purchased to Brownsville, Texas.

RUSSIA

THE German-Russian Deruluft Company which maintains the regular air service between Germany and Soviet Russia via Latvia, resumed the air service on these routes on May 15.

EASTERN CANADA

[JAMES MONTAGNES]

MONTREAL'S second annual air show was held from May 4th to 11th at the Stadium Building. Just as it occupied a larger building this year than that used last year, so the whole exhibition showed progress, for instead of less than a dozen ships on display as a year ago, there were this year twenty-five ships of various makes, including one trimotor. Ships which have not yet made their appearance on the floor of American shows included the Vickers amphibian planes, and a French Schreck seaplane.

Some forty booths were given over to parts, accessories, airways, and schools. The English planes on exhibition included the Avro-Avian, Bluebird, De Havilland Moth, Simmonds-Spartan, and Siskin military plane. The Canadian built Curtiss-Reid Rambler was on display. The other planes were either of American or Canadian manufacture, all being American types. These included the Curtiss Robin, Curtiss Ireland Flying Boat, Fairchild 71, Fairchild 21, Fokker Super-Universal, Ford Trimotor, Travel Air 6-place monoplane, Travel Air 3-place biplane, Monocoupe, and Wallace Touroplane. American and British engines were exhibited by the manufacturers at special booths, while parts and accessories were mainly displayed by the Canadian branch firms of American manufacturers.

THE boat mail to Rimouski has been started again, mail being picked up at Toronto, Ottawa and Montreal by plane, and carried by air from Montreal to Rimouski in the St. Lawrence, where the incoming and outgoing European liners are met.

WESTERN CANADA

[C. D. MCCABE]

AVIATION has certainly taken a firm hold on the people of Western Canada as is shown by the interest taken in the various flying clubs formed during the past year. The plan of government in helping the new clubs has had remarkable success and there are flourishing clubs in most of the larger cities of the west. Winnipeg had the second largest number of flying hours, Toronto being first. Saskatoon was the second club to qualify under the Dominion requirements; they have two planes and two more to be delivered soon.

The city council of Regina has made an appropriation to build a first class airport, and plans are made for a $15,000 air field at Prince Albert. North Battleford and Estevan are building landing fields, and an airport by-law is being submitted to the people of Edmonton. The Calgary Flying Club is conducting a campaign for 1,000 members and a civic airport equipped for night flying. Fields are being laid out in Vegreville, Coleman MacLeod and Drumhiller, Alta.

THE finest air meet we have had yet was held at Stevenson Field, Winnipeg, May 24-25. The local flying club men deserve a lot of credit for their work. There were a number of new planes on exhibition, including two big trimotor machines, a Standard Oil Ford and a Western Canada Airways Fokker. Flying club planes from Calgary, Edmonton, Saskatoon, Moose Jaw and Regina came down with a number of civilian planes from the west. There were a number of interesting events, including balloon bursting, bombing, stunting and various races.

THE latest company to enter the Canadian air business is the North-Western Airways, Ltd., composed of a group of young business men, with headquarters in Winnipeg. They have been granted the agency for the De Havilland Moth between Fort William, Ont., and the Saskatchewan-Alberta boundary, also establishing a flying school and engaging in other work.

BRITISH COLUMBIA

[AUBREY F. ROBERTS]

ENTRY of the Boeing Airplane Co. of Seattle into the Canadian field by the establishment of a factory in Vancouver has given a considerable stimulus to aviation in British Columbia. The Boeing Aircraft, Ltd., of Canada, resulted from the merger of Hoffar-Beeching Shipyards, Ltd., of Vancouver, with the Boeing interests.

The new company has already started construction of a $100,000 addition to the Hoffar-Beeching Shipyards plant on Coal Harbor where the first Canadian-built Boeings will be produced. It is expected that the plant, which will have a floor area of 30,000 square feet, will start production early in July.

Boeing flying boats, which have been found especially suited to Western Canada conditions, will be the first products of the new factory. British materials will be used as much as possible, including English steel, Canadian Pratt and Whitney engines, and British Columbia spruce and copper.

Both Mr. Hoffar and Mr. Beeching are pioneers of aviation. The former built and flew in 1914, the first seaplane constructed in Canada. Mr. Beeching was a war-time flier who afterwards engaged in commercial aviation.

THE Vancouver branch of the Aero Club of B. C. after several months' waiting has finally reached its objective—club flying. At present two D. H. Moths allotted to it by the Dominion government are very busy.

St. Louis

the Strategic Location *Center of* America's most Favorable Region *for* Airplane *and* Allied Manufacturing

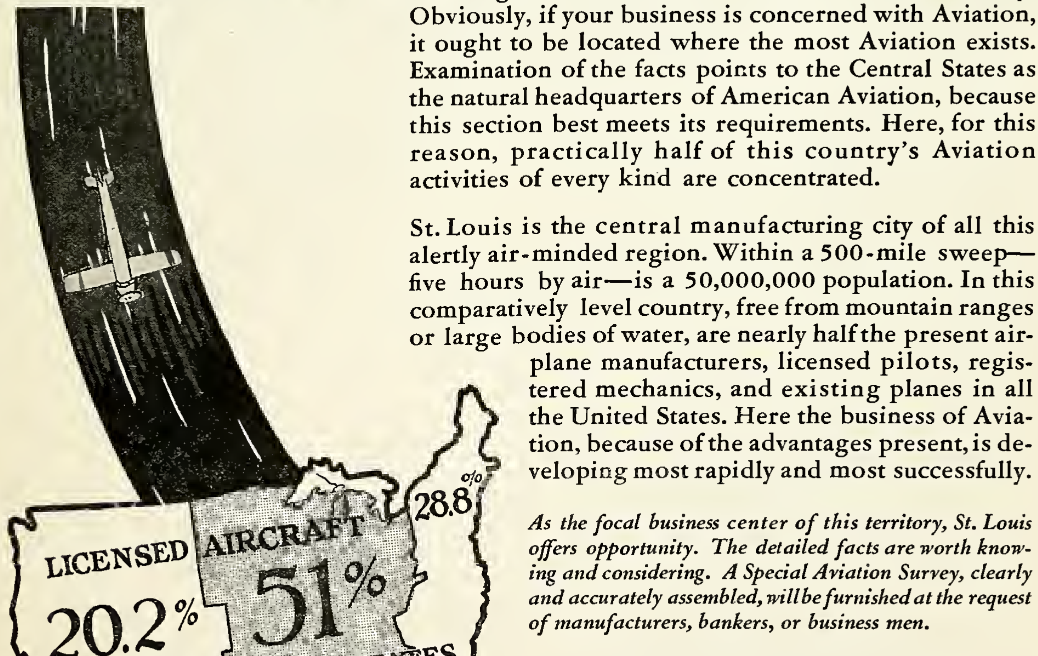
AVIATION, as an industry, will naturally develop along lines similar to other modern industries. Through the experimental and the spectacular, it has already reached the manufacturing stage. A new giant industry is in sight. Soon will come standardized, mass production. And then will appear the old, familiar problems of economical manufacturing and efficient distribution.

To such problems the master key is Location. Geographical Location can actively work for or against, a business. Since the Industry of Aviation is so new, it starts without handicaps. It is easy for a manufacturer in this line—today—to entrench himself behind the solid advantage of strategic location. It is better to establish oneself now, with an eye toward the future, than to wait until business roots have sunk deeply into an unfavorable location.

Where Aviation Advantages are Concentrated

Strategic Industrial Location so places a factory that natural conditions, raw materials, power, labor, transportation, markets and other cost-affecting factors combine to serve it most efficiently. Obviously, if your business is concerned with Aviation, it ought to be located where the most Aviation exists. Examination of the facts points to the Central States as the natural headquarters of American Aviation, because this section best meets its requirements. Here, for this reason, practically half of this country's Aviation activities of every kind are concentrated.

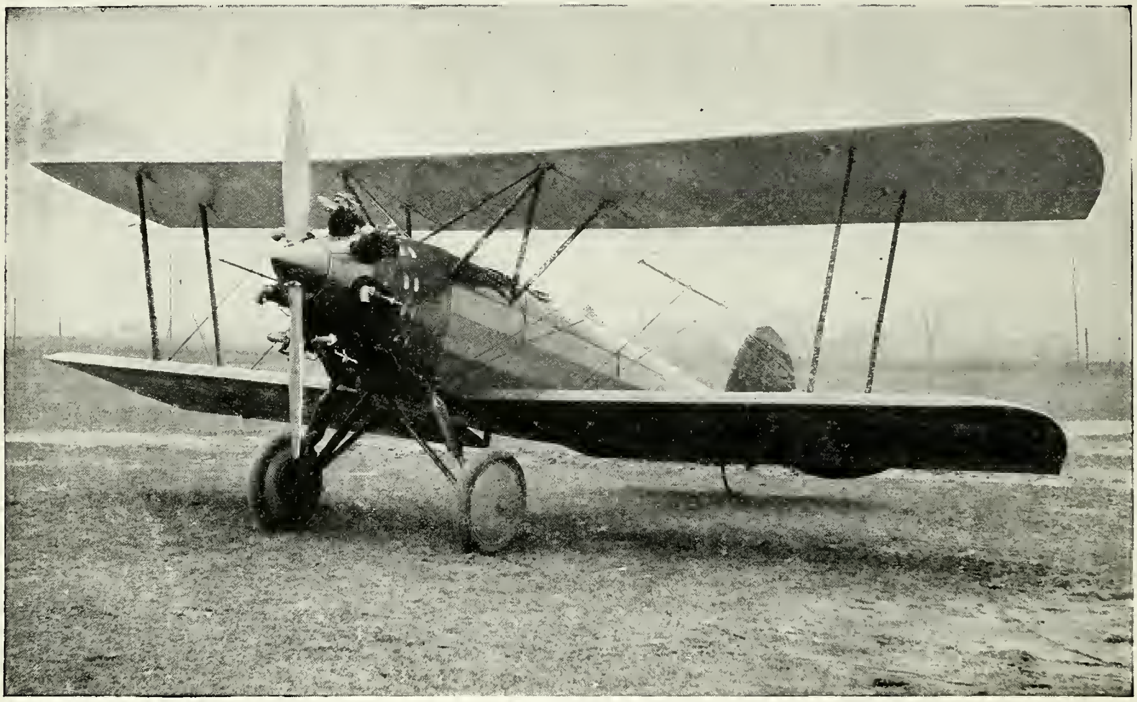
St. Louis is the central manufacturing city of all this alertly air-minded region. Within a 500-mile sweep—five hours by air—is a 50,000,000 population. In this comparatively level country, free from mountain ranges or large bodies of water, are nearly half the present airplane manufacturers, licensed pilots, registered mechanics, and existing planes in all the United States. Here the business of Aviation, because of the advantages present, is developing most rapidly and most successfully.



As the focal business center of this territory, St. Louis offers opportunity. The detailed facts are worth knowing and considering. A Special Aviation Survey, clearly and accurately assembled, will be furnished at the request of manufacturers, bankers, or business men.

Write Dept. A-3
INDUSTRIAL BUREAU *of the*
INDUSTRIAL CLUB OF ST. LOUIS
511 Locust St., St. Louis, Mo.

KREIDER-REISNER



The high performance Fairchild KR 34A, a three place biplane, formerly the Kreider-Reisner "Challenger" C 4A.

OFF the ground quicker! Faster climbing! Higher speed in the air! This has always been the reputation of Kreider-Reisner planes. Careful engineering has made them light, with no sacrifice of strength and ruggedness. They are used extensively where fields are small and rough—where performance counts. They are adapted to this service, and need a minimum of repair.

STANDARD equipment on Kreider-Reisner planes includes many instruments and accessories not ordinarily found: airspeed, altimeter, compass, tachometer, oil-pressure gauge, temperature gauge and gasoline gauge. Other items of standard equipment include a booster starter, dual controls, radiator shutters (for water-cooled engines), cockpit covers, engine covers (for air-cooled engines only), tie-down ropes, tools, log book, first-aid kit and fire extinguishers.

IN addition, the front cockpit is also piped for the installation of an oil-pressure gauge and in the case of the KR21, oil-pressure and oil-temperature gauges are installed in the front cockpit. The wings of the KR34 and KR21 are wired for navigation lights. Wheel brakes are standard equipment on the KR34 and can be had as extra equipment on the KR21.

PERFORMANCE AND SPECIFICATIONS

MODEL ENGINE H. P. and R. P. M.	KR31 Curtiss OX-5 90/1400	KR34A Comet 130/1825	KR34C Wright 165/2000	KR21B Warner 110/1825	KR21A Kinner 90/1810
Seating Capacity (Inc. Pilot)	3	3	3	2	2
High Speed (M. P. H.).......	102	120	130	120	120
Rate of Climb Full Load (F. P. M.)...................	548	615	886	800	800
Service Ceiling (Ft.).........	12000	16500	17000	17000	17000
Wing Loading (Lbs. per Sq. Ft.)	7	8.4	8.4	8.02	8.02
Power Loading (Lbs. per H. P.)	23	18.4	14.5	14.1	17.2
Weight Empty (Lbs.)........	1200	1330	1435	964	950
Disposable Load (Lbs.)......	878	1070	965	586	600
Gross Weight (Lbs.).........	2078	2400	2400	1550	1550
Gasoline Capacity (Gals.)....	33	50	50	23	23
Oil Capacity (Gals.).........	4	4	4	3	3
Length Over All............	23′-9″	23′-2″	23′-5″	22′-7″	22′-1″
Span......................	30′-1″	30′-0″	30′-0″	27′-0″	27′-0″
Wing Area (Inc. Ailerons, Sq. Ft.)....................	296	285	285	193	193
Aileron Area (Sq. Ft.).......	30	36	36	17½	17½

now a unit of

FAIRCHILD AVIATION

Corporation

Presenting a line of high-performance biplanes

In keeping with Fairchild Aviation's policy of offering a plane for every purpose, Fairchild has acquired the Kreider-Reisner Aircraft Co. and, to the line of Fairchild cabin monoplanes built at Farmingdale, has added a line of Fairchild high-performance biplanes manufactured at Hagerstown, Maryland.

In acquiring Kreider-Reisner, Fairchild obtains a product famous for performance—biplanes that have been through two years' testing in service and of which more than 200 are now flying.

To this already established and well-organized company, Fairchild brings new financial resources and nation-wide sales and service facilities. Fairchild engineering and research will insure that Kreider-Reisner biplanes will be still further improved and will be in the future, as in the past, leaders in performance and dependability.

One of the immediate results of this acquisition is the construction of a large new plant at Hagerstown, Md., equipped with most modern machinery and employing many methods and processes exclusive to Kreider-Reisner and Fairchild. This expansion is necessitated by the demand for these high-performance biplanes, which already means an increase in production for 1929 of nearly five times that of 1928.

This latest move of Fairchild means to operators and pilots a product improved over even the fine Kreider-Reisner biplanes of the past. It means an extension of the fine service to owners which is a consistent standard in all Fairchild divisions.

To dealers it means a greater profit opportunity. These high-performance biplanes will be distributed through Fairchild sales organization with factory centers of sales and service at Farmingdale, Hagerstown, Chicago, Dallas and Los Angeles.

Sport fliers, pilots, operators, business houses and dealers should find it to their interest to know more about Fairchild biplanes. Address your inquiries to Fairchild Airplane Mfg. Corp., Farmingdale, L. I., or to nearest district office. 332 S. Michigan Ave., Chicago; 2102 N. Harwood Ave., Dallas; 228½ E. 11th St., Los Angeles; and in Canada: Fairchild Aircraft Limited, 505 Confederation Bldg., Montreal, P. Q.

FAIRCHILD

FA

AIRPLANES

TECHNICAL

QUALITY IN ENGINE PRODUCTION

By George J. Mead

Vice-Pres. Pratt & Whitney Aircraft Co.

Inspecting connecting rod forgings

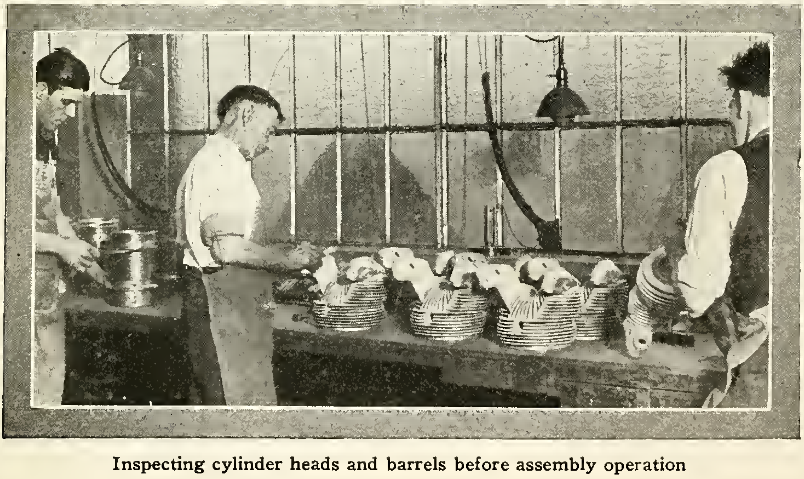
QUALITY in aircraft power plants is an obvious essential; it cannot be slighted to cheapen the product; but one standard can be maintained. This makes necessary an entirely different attitude toward quality and its enforcement than is found in any other industry.

The principal requirement of an aircraft power plant is reliability. To meet such a requirement involves proper design as well as correct material and dimensional accuracy. Under these circumstances, the work of the Engineering Department of an engine company is so closely connected with that of the Inspection Division that it is first of all desirable to consider the relation of design to quality.

Proper design and materials specifications facilitate inspection and thereby reduce costs. Certain design features primarily affect the durability of the part. The form of each part is important because it affects the fabrication of the material in the rough and has considerable bearing on the uniformity of cast and forged pieces. Cylinder heads, for example, must be of such shape that gas pockets are not apt to form and thus cause porosity. Care should be taken in connecting rod design to provide proper grain flow in the forgings. Shape likewise facilitates the inspection of such parts, both in the rough and finished conditions. The determination of the proper material for each part requires careful consideration in order to maintain uniformity of production. Besides uniformity, consideration should be given to the characteristics of the material at operating temperatures. Very little information is even now available on this subject.

It has been found in some cases that materials which are considered poor when cold are superior to others when hot. It is of great help to the Inspection Department to restrict the number of different kinds of steel to a minimum. This results in a slight increase in material cost, but goes a long way towards overcoming the possibility of poor material going into the fabrication of important parts. In the case of the Pratt and Whitney Aircraft Company, only six different steels are used and no screw stock whatever. Case hardened materials are to be avoided because of the difficulty of maintaining uniform strength. Often forged aluminum parts are used to advantage in place of castings.

With a general idea of the quality standards required and the part taken by the Engineering Department in setting up such standards, we ought next to consider the functioning of the Inspection Department. Obviously the Inspection Department's primary duty is to see that the product meets the requirements of the Engineering Department and then that the work is done at a minimum cost and production suffers no unnecessary delays. For this reason, the Inspection Department comes under the direction of the chief engineer, rather than under the factory manager, as is the usual procedure. With this arrangement, efficient scheduled production can be carried out only with the full coöperation of the Manufacturing Department, and to that end we enlist the aid of every foreman, sub-foreman, and operator, constantly bringing before them the necessity for careful attention to all details of manufacture.



Inspecting cylinder heads and barrels before assembly operation

The Pratt and Whitney plant inspection system—which covers all material from the rough stage until it has been thoroughly tested in the finished unit—includes several different types of inspection. In the case of rough materials—which comprises castings, forgings, bar stock, tubing, etc.—it is quite necessary to conduct inspections with the same care as is required for the inspection of finished parts. Quite obviously the passing of defective material in the raw state may result in considerable unnecessary machining expense. Inspection work on forgings and castings begins with a complete lay-out of the first casting produced from new patterns or lead proofs from new or changed dies. This must be done before parts are released for production.

All forgings when received are checked for hardness and marked with a lot number which is tied up with the lot number and heat number from the steel mill and forge shop. Certified copies of the physical tests are filed. Each master connecting rod and each crankshaft is given a special serial number, so that reference to the records at any time will reveal its entire history. The inspection of the rough forgings consists also of careful examination for cracks, laps, seams and other surface imperfections. The forgings are etched before examination.

Certain forgings from various lots are sectioned and etched in order to examine them for grain flow. This is important in keeping engine weights down to a minimum, for maximum strength and resistance to fatigue are of prime importance. The matter of proper grain flow is necessary in most of the steel parts. Gear blocks, connecting rod forgings, crankshaft forgings, and numerous other pieces are subject to these tests.

All castings before leaving the foundry receive their first inspection, which consists of a general check for shrinks, misruns, mis-

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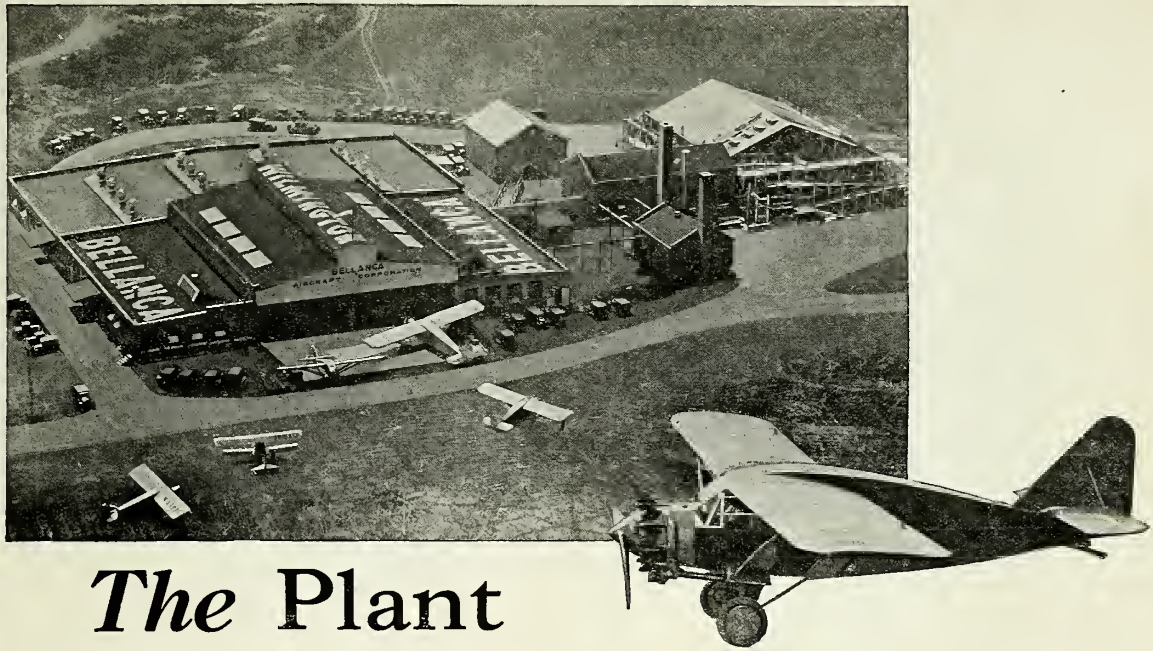

The Plant *Behind the* Plane

You are welcome at Bellanca Airport, one of the finest flying fields in the East. Come as a ground visitor, or air transient—come for Bellanca service, or a demonstration flight—and learn how ruggedly the Bellanca is built.

Back of the plane stands a substantially-financed organization, thoroughly equipped in every branch of aircraft building—a busy plant expanded over 100% early this year, to meet the fast-growing demand for Bellanca Aircraft. Here the Bellanca engineers, through consistent study of construction methods and materials, have developed results that mean certainty of delivery and service.

This is where Bellanca performance begins! Speed, climb, comfort and safety are and always have been the built-in features of Bellanca design. Even in aircraft decoration, you find that the originality which introduced the cabin monoplane to American aviation still leads, with interior cabin decoration comparable to the most advanced motor car finishing. Bellanca efficiency is topped off today by the innovations of comfort and luxury which earned for the Bellanca a place of recognized distinction at the Detroit Show. Bellanca Aircraft Corporation, New Castle, Delaware.

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The Bellanca Distributor Franchise is a foundation of strength for the profitable development of the distributor's business. It is sound, liberal, and earns the immediate respect of any banker. In this franchise distributors are assured of the complete co-operation of a solidly financed and capably managed manufacturing company with thoroughly organized production facilities.

The Bellanca CH 300, U. S. Department of Commerce Approved Type Certificate No. 129. Acknowledged leader for efficient performance in the Whirlwind-engined class of cabin planes. Quickly disassembled into small, easily-shipped and easily-handled units. Two pilots; dual control; greatest known range of visibility. Seats six persons in comfortable, tastefully appointed cabin. Pilot and payload, 1,215 lbs. Range with full payload, 5½ hours, or 670 miles at cruising speed. High speed 145 m.p.h. Cruising speed, 122 m.p.h. Landing speed, 48 m.p.h. Climb at sea level, 1,100 ft. per min. List price: with Wright J-6 engine, $14,950 (with J-5 engine, $14,050).

(*Continued from preceding page*)

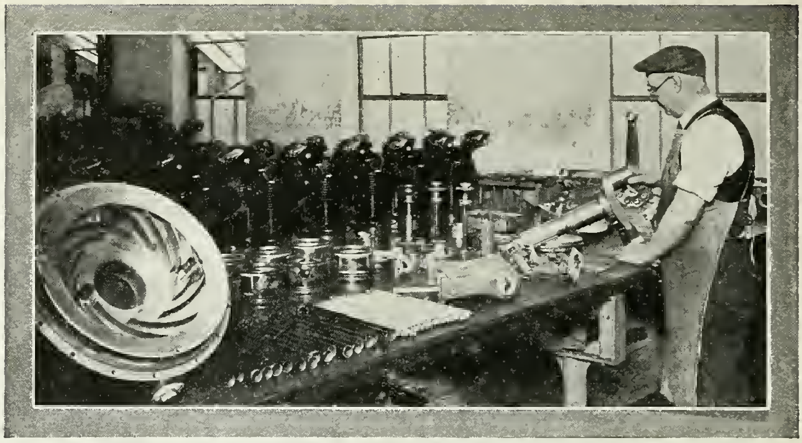
placed cores, water test, and a tensile test of bars cast from the same heat of metal. A further check is made when the parts are received in the Raw Material Inspection Department. This consists of tests for hardness and a closer examination of the castings for dimensional defects. Each lot of castings at some time during operations is tested with water pressure, varying according to the nature of the casting. All pistons, for example, are tested before and after machining at five hundred pounds per square inch of water pressure and must be free from leaks at this pressure. Cylinder heads are tested under the same pressure both before and after shrinking onto the barrels.

Bar stock when received is tested for hardness and chemical composition regardless of previous checks at the steel mill before shipment. Each lot of material is stamped with a serial number. Each bar is checked for hardness on both ends and in the center and is carefully inspected for cracks, laps, pipes, and other imperfections, by etching a piece out from the bar. In the case of bar stock for the more important parts, such as piston pins, knuckle pins, etc., every bar is analyzed for chemical composition. Each bar carries its own serial number and each piston pin is stamped with the bar number from which it is made. This number is carried through to the finished pin, making it possible to trace its history through permanent records to its origin at the rolling mill.

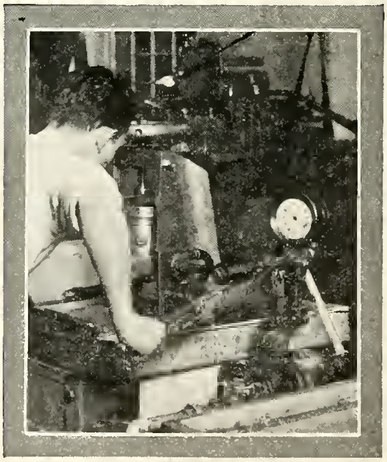
Magnetos, starters, generators, carburetors, switches and such parts come under the classification of purchased finished parts. A complete system of inspection and checking is carried out on parts of this nature to insure that the parts will function properly when the engine is submitted to test and will not delay the test thus holding up expensive equipment. Beyond such inspections these parts are checked in detail at the source of manufacture. Parts being shipped as spares are all checked 100 per cent, and certain other inspection operations are carried out at assembly.

Some inspection operations are carried on while the work is in process. This checking applies principally to automatic or semiautomatic operations. Similar checking, however, is carried on during operations on most parts in order that any errors may be detected before an unnecessary amount of scrap is produced. But process inspection is primarily to insure accurate dimensional control of parts which are permanently attached to others during process of fabrication, such as cylinder heads and barrels. These and numerous other parts which become permanently attached to each other during the process of manufacture are subject to this type of inspection.

Besides the careful inspection of component parts, it is, of course, essential to check thoroughly the assembled unit. To this end, each engine after assembly is belted in with an outside source of power for a period of time to be sure that all parts are functioning properly and to give the wearing surfaces some initial polish. An operation of this nature provides an opportunity to be sure that oil pumps, magnetos, fuel pumps, valves and other parts are functioning normally under such conditions. The test, however, is not considered of any great value in wearing in bearing surfaces, but is worth while from the point of view of detecting anything which may be wrong, such as the items mentioned above, thereby again insuring freedom from delays when the engines are mounted on the test stand.


Inspecting a Wasp engine torn down after the manufacturer's test

After belting in, the engines are submitted to a run in under their own power mounted on reaction torque stands and put through the manufacturer's test. This consists of nine hours' running at gradually increased throttle. They are then returned to the Assembly Department, completely torn down, the parts washed, and carefully inspected to be sure that all bearing surfaces are wearing in normally and all parts functioning as they should. The engines are then again built up; and after a second running, are submitted to a final test, at which time they are operated at full throttle, the fuel and oil consumption, oil pressure, fuel pressure, oil temperatures, and other pertinent information being noted. At this time checks are made for oil leaks, general operation, including starting, idling, acceleration, etc. At the successful completion of the test the engines are washed, carefully oiled to guard against rust during shipment, and packed. They are given a final external inspection before packing. Thus it will be seen that the Inspection Department must function from the time the work is started at the steel mill, foundry or forge shop until the product is packed for shipment.


Water testing pistons under pressure

Where quality is of such importance it is essential that there be frequent checks on inspection. Diligence with a micrometer, for instance, is misplaced unless the micrometer itself is accurate. For this reason, all measuring devices are frequently checked against standards. Beyond this, the accuracy of the personnel should be frequently verified as well. This may be done in several ways. One of the best is to re-inspect parts on the assembly floor. However, as a further complete check on the assembled engines, every sixty days a Wasp or Hornet engine is taken at random from the assembly line. The engine so taken is subjected to a fifty-hour endurance run. This practice is similar to that required by the Army and Navy before accepting a new type of engine on contract. It differs, however, in that the services only require the engine to be run at rated power in ten five-hour periods. The Pratt and Whitney test is at full throttle in five ten-hour periods.

An endurance run of this type is considerably more severe than ordinary production testing and represents the equivalent of several hundred flying hours. It serves as a complete check on all raw materials going into the engine and reveals any failure of the Production Department to follow the prescribed instructions on the heat-treating of parts, etc. It also curbs any unorthodox manufacturing practices which may creep in from time to time when attempting to meet a tight production schedule.

Inspection costs on precision work of relatively small production volume are bound to be high, for the quantities involved do not permit of special inspection set-ups. Of course, go and no-go snap gauges and plug gauges are used, and all the smaller modern inspection equipment. Certain special checking figures are provided where necessary. Among these are rolling fixtures for gears and certain special checking fixtures for the inspection of castings to check for accurately-placed cores. As the quantities have increased we have been able to

(*Continued on next page*)

STROMBERG
CARBURETORS
are used as standard equipment
. . . *by* . . .

Aircraft Engine Corp.
The Alliance Aircraft Corp.
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Axelson Machine Co.
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Curtiss Aero. & Motor Co.
Fairchild Caminez Eng. Corp.
Kinner Airplane & Motor Corp.
Lambert Aircraft Co.
(formerly Velie Motors Corp.)
LeBlond Aircraft Engine Co.
Lycoming Motor
MacClatchie Manufacturing Co.
Michigan Aero. Engine Corp.
Navy Department
Pratt & Whitney Aircraft
O. E. Szekely Corp.
War Dept.—Air Corps
Warner Aircraft Corp.
Wright Aero Corp.

STROMBERG
growing with aviation

Years ago when aviation was in the experimental stage Stromberg was experimenting, too, with an aircraft carburetor. One that would be dependable, light. That would supply the proper fuel mixture to the engine at all speeds, in all positions—efficiently and economically.

Such a carburetor was developed. The difficulties of propeller blast and upside down flying were overcome. A dependable, durable, economical carburetor was designed and built.

The aviation world quickly recognized the remarkably fine performance of Stromberg carburetors. With the result that over 90% of American aircraft flying today are Stromberg equipped. And—as aviation grows, and new planes and new engines are developed, inevitably builders turn to Stromberg for the solution of their carbureting problems.

STROMBERG MOTOR DEVICES COMPANY
58-68 E. Twenty-fifth Street, Chicago, Ill.

Factory Branches
New York, N. Y. Detroit, Mich. Minneapolis, Minn.
Kansas City, Mo. London, England

(*Continued from preceding page*)

bring in more and more special equipment, which cuts inspection costs without a reduction in quality. At present a visual inspection of each steel part is made for surface imperfections. It seems very probable that in the near future electric or magnetic apparatus will be available to do this work with greater accuracy.

Another phase of the inspection situation is the reduction of scrap and elimination of unnecessary labor on a piece by process inspection. Great care is taken to be sure at the beginning that the rough material is not defective. Then on the major parts process inspection is carried out at frequent intervals. This system involves a greater inspection cost, but reduces the manufacturing cost per engine because of its effect on machine shop scrap. The system maintained in the Pratt and Whitney plant provides for inspection in the various departments where the work is being manufactured, rather than sending all parts to a final inspection department. This saves a great deal of trucking. In cases where errors are found, the work is then close to the foreman and operators responsible for production of the parts, which makes it much easier to correct mistakes without undue delay and guard against a repetition of them. Dimensional accuracy is, of course, more easily maintained by the use of proper fixtures for each operation. Properly set up automatic machinery also acts as another aid. Just as it has been proved in other work, it is cheaper in the end to make the parts right than to try and fit parts with wide limits by selection or hand fitting.

The question of quality standards is particularly important to the industry as a whole at the present time. The sudden enthusiasm for aviation has increased the volume of production of experienced manufacturers and at the same time induced a large number of relatively inexperienced companies to enter this field. Both of these conditions have a tendency to lower quality. A manufacturer's future business depends upon the reputation of his product and therefore it behooves each one to maintain the highest standard of quality. This is perfectly possible for the established manufacturer, since he knows by experience what steps should be taken to insure a satisfactory product reaching the users. It is quite a different problem, however, for a new manufacturer entering the field, since the requirements are so different from those in any other mechanical industry. It is very easy for the inexperienced unintentionally to set up quality standards which are not at all safe. Morever, his methods of inspection may not be rigid enough.

The Federal Government exercises a certain amount of control over quality. Any new type of power plant must satisfactorily pass a type test as prescribed by the Department of Commerce. A certificate to this effect simply means that the design and fabrication of this sample engine is considered satisfactory. At the present time there is no particular check to insure the product of the manufacturer being similar to the sample that has been approved. The insurance companies, however, influence the maintenance of quality indirectly by their rates. This is a helpful situation, but of course it is based on the performance of the power plant once it is in service and does not necessarily preclude an inferior article reaching the hands of users.

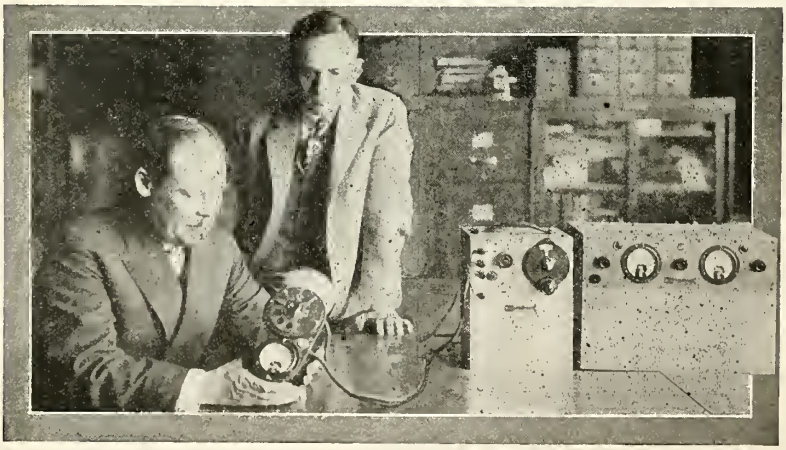
Briefly, quality depends on excellence of design as well as the careful selection, manufacture and inspection of the materials used in the fabrication of the power plant. Dimensional defects very seldom reach a customer, and even if they do, they are not apt to cause a forced landing. Proper material is of utmost importance. There can be only one standard of quality and that the best. It will be a serious matter if any aircraft engines of inferior quality reach the hands of the public, since not only the reputation of the manufacturer but the welfare of the industry as a whole will suffer.

RADIO ECHO ALTIMETER

A RADIO echo altimeter utilizing red, green and yellow lights, has been developed by Dr. E. F. W. Alexanderson, consulting engineer of the General Electric Company. In the Alexanderson altimeter, which has been successfully employed in actual flights, the lights give a visual warning of height. When the green light flashes on the cockpit panel, the pilot knows he is 250 feet above ground; when the yellow shows, he is 100 feet above ground; and the red lights give a positive warning that the ground is only 50 feet below the plane.

The visual recording instrument is small and may be mounted on the cockpit panel in full view of the pilot. It consists of a meter on which ground distance up to 3,000 feet may be recorded. It is in the lower regions, however, that danger lies, and it is in the recording of levels down to 50 feet that he has been most interested.

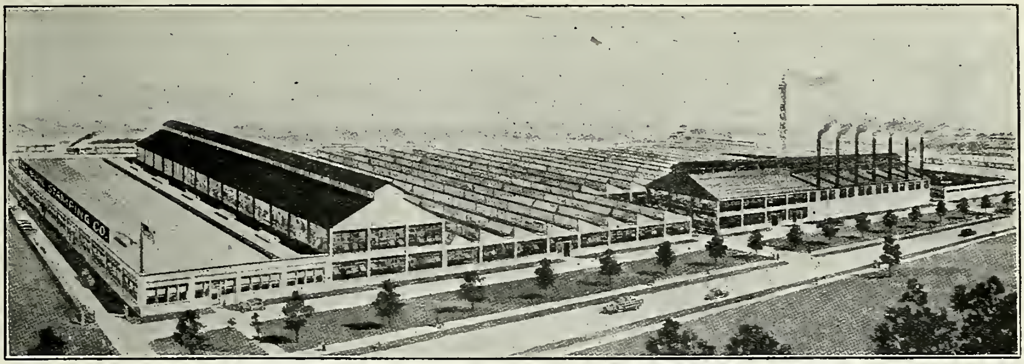
Because the time interval between the outgoing and the reflected radio impulse is so short, an indirect method of making such measurements was adopted by Dr. Alexanderson. In his experiments he used an oscillating receiver, one of the type which sends out a wave which may be picked up on other receivers as a squealing note or beat. The echo or reflected signal was picked up on the same receiver which sent out the wave. Dr. Alexanderson discovered that every time the airplane changed altitude by half a wave length, a whistling note went through a complete tone cycle, from low pitch to high pitch and back again to low pitch. By counting the cycles of the tone it was possible to measure the altitude, the measuring stick being one half the wave length of the antenna oscillator.



Dr. Alexanderson and his radio echo altimeter for aircraft

By means of the meter, graduated from 3,000 to 200 feet, the pilot may read his altitude within those limits, at any time. The echoes indicating height are periodic, becoming stronger as the plane approaches ground. The periodic character of the echo and the chance that the pilot would not see the instrument at the instant an echo was recorded, presented a problem which Dr. Alexanderson met by developing a memory meter. In this instrument the echo is recorded as altitude when it occurs and the meter continues to hold that reading until a stronger echo indicating a lower altitude occurs. In approaching the earth, the memory meter gives a continuous indication of altitude. If depth sounding is desired when climbing, in which process the echo is becoming weaker, a push button may be used to eliminate the memory features of the meter and each succeeding reading is indication of the next echo. Thus a depth sounding may be taken at any time during the cruise whether ascending or descending.

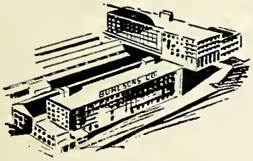
A new gasoline gauge, developed by J. H. Payne of the Research Laboratory of the General Electric Company, measures the gas supply by weight, the variation in the weight of fuel being shown on an electric meter with a scale calibrated to indicate gallons. The device consists of a smaller meter container about the size of an ordinary door knob which is attached to the drain cock at the bottom of the fuel tank and connected to an electric meter in the cockpit panel of the plane.


BUHL STAMPING CO.

Equipped to Meet Any Emergency

Some few weeks ago the Buhl Stamping Company started production on another important metal stamping for a certain prominent airplane motor manufacturer. His maximum schedule was carefully laid out for three months in advance. It was carefully fitted into the Buhl production plan, and everything was set to go. The day before the first wheel turned this manufacturer wired to double his requirements. He is getting his parts today—on the same schedule in double quantities. How did Buhl do it? It is sufficient to know that here you find facilities equal to any emergency, and resources in men, money, and materials that guarantee prompt, efficient service and performance.

BUHL BUILDING
DETROIT


BUHL SONS CO.
BUHL SONS COMPANY
DETROIT

BUHL
STAMPING COMPANY
DETROIT, MICHIGAN

BUHL AIRCRAFT CO.
MARYSVILLE

The Buhl name has been identified with progressive industry since 1833. Buhl products today carry far more than the name alone—they preserve the priceless heritage of almost a century of manufacturing leadership and integrity.

GREAT LAKES
TYPE 2T-1
LIGHT PLANE

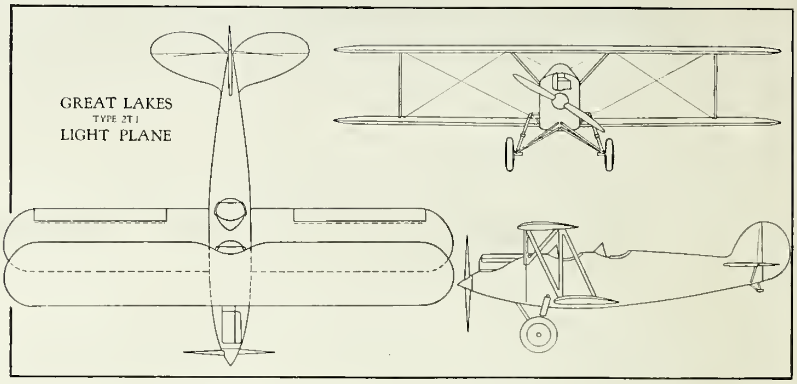
THE Great Lakes Aircraft Corporation of Cleveland recently introduced a light training and sports plane, known as model 2T-1, which was exhibited and demonstrated at the All-American Aircraft Show in Detroit, March 6-14. Charles W. Meyers, chief test pilot of the corporation, and one of the designers of the plane, made the initial test flights with the ship. The 2T-1 is a two-place open job, with dual controls, built of duralumin and powered by a 95-horsepower Cirrus four-in-line air-cooled motor. Its span is 26 feet eight inches, length 20 feet, and height seven feet 11 inches.

The general arrangement of the wing group conforms to the conventional biplane plan. The upper and lower wings are of equal span and chord, and arc of uniform section throughout the span. They are staggered 25 inches. The wing beams are made of solid spruce. The ribs are of stamped 17 S.T. aluminum alloy. Drag struts are 17 S.T. aluminum alloy tubing. Drag wires are square tie rods and the leading edge is covered with 17 S.T. aluminum alloy. The upper wing consists of one panel, the trailing edge being cut in to provide increased visibility upward and aft, and also to afford easy access to the front cockpit.

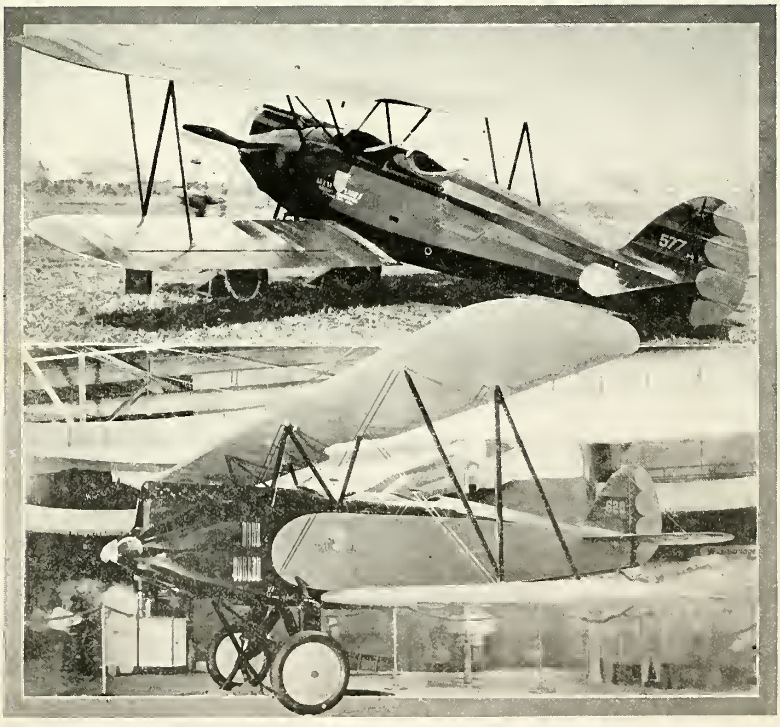
The landing edges of the pilot's and student's cockpits are covered, and a crash pad is put in the center of the instrument board. A flame type fire wall is installed aft of the engine compartment.

A two-wheel landing gear is provided, the wheels arranged to swing outboard and forward when compressed, about a line through the lower longeron. Brakes are optional, and the arrangement permits their operation by a hand lever, which in turn is connected to the rudder pedals, giving brake control on either wheel or both.

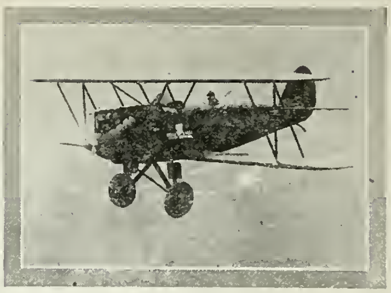
The power plant consists of the Cirrus Mark III, rated at 95 horsepower at 2,100 revolutions per minute. The ignition switch is installed in the front cockpit with an extension lever through the rear cockpit. Either electric or hand inertia starter may be installed.



A gravity fuel tank of welded aluminum sheet is in the upper center wing. Shut-off cocks are provided, being controlled from either cockpit. All gas lines are of aluminum with rubber connections.



The Great Lakes light plane on the field and as it was exhibited at Detroit.



C. W. Meyers flying the 2T-1

Each cockpit has a complete set of flying controls, with positive stops to limit their travel. The fin is non-adjustable and is integral with the fuselage. The fin brace wires are of streamline tie rods. Provision is made in the fin for navigation lines. All mechanism and wires are inside the fuselage.

Ignition switch, throttle, mixture control and choke are installed in the front cockpit. The rear cockpit has a tachometer, oil pressure gauge, oil temperature gauge, altimeter, throttle and choke.

The seats are designed to accommodate seat type parachutes, with a retaining strip across the forward edge to prevent the parachutes from sliding forward. Windshields are made of pyralin and interchangeable. Safety belts and cushions are provided in both cockpits and a pint size fire extinguisher is accessible to both places.

Fuselage and all surfaces are fabric covered, and internal surfaces for all welded tubes are protected. The structure is rigid and by the use of fixed end struts a minimum of alignment and adjustment is required.

An unusual degree of visibility has been attained in the 2T-1.

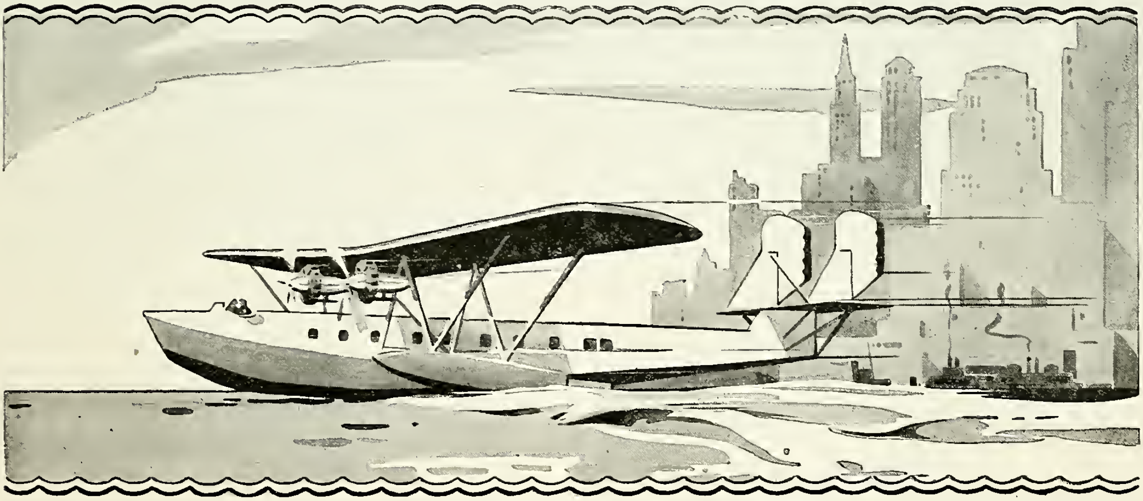
Captain Holden C. Richardson, vice president in charge of engineering and design, P. B. Rogers, assistant chief engineer, and C. W. Meyers, participated in the designing of the plane.

Performance

High speed	115 miles per hour
Cruising speed	95 miles per hour
Landing speed	40 miles per hour
Initial climb	1,035 feet per minute
Climb, first ten minutes	8,000 feet
Service ceiling	17,150 feet
Range (full speed)	369 miles
Range (cruising speed)	580 miles

A LEVIATHAN of the AIR

Everything about the Commodore, sister-ship of the famous Consolidated Navy Patrol Plane, PY-1, is on a huge scale. Its overall length of 60 feet—its wing-spread of 100 feet—its super-horsepower—its great load-carrying capacity including pilot—assistant pilot—mechanic and steward—commodious passenger accommodations—cargo space of 200 cubic feet for mail and express—and fuel to fly 1000 miles at well over 110 miles an hour . . . truly make it a modern Leviathan of the air.



Equally great are the Commodore's pay-load and profit possibilities for the transport operator in territory that by topography and flying conditions makes the use of flying boats desirable. The Commodore can land and operate in any kind of weather—minimizes overhead and upkeep—and in every way fulfills the need of economical air transportation . . . wherever there is water. Write today for full particulars . . . and a comprehensive survey showing the Commodore's operating costs . . . and big profit-making possibilities in commercial air transport.

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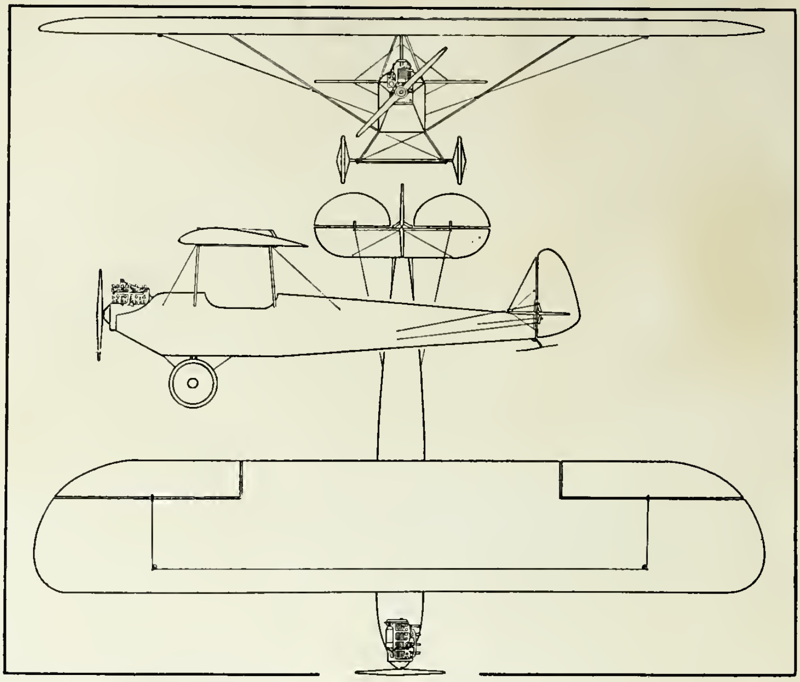
The COMMODORE

THE HEATH SUPER PARASOL



Scale drawings showing the outlines of the Heath Super Parasol monoplane.

THE Heath Super Parasol is produced by the Heath Airplane Company of Chicago, Ill. E. B. Heath, president of the company, has been active in the design and construction of light airplanes for many years. His first ship, built in 1908, was powered with a 25 horsepower 2-cylinder opposed motor. In 1913 he constructed one of the lightest flying boats in the history of aeronautics.

The Super Parasol is an unusually small and light single-seater monoplane, particularly suited to sport flying. It can be fitted with a 4-cylinder converted Henderson motocycle motor, a 3-cylinder Anzani, a 2-cylinder Wright Morehouse, or a 2-cylinder Bristol. The converted Henderson develops 27 horsepower at 3,000 revolutions per minute and weighs, complete with propeller, 117 pounds.

Wings are of conventional design and construction, having spruce spars and spruce ribs and webs. The rib weighs only 2¾ ounces and will carry an unusually heavy load. Two panels are used, pinned together without center section. They are supported above the fuselage by two invented V-struts, one in front and one aft of the cockpit, and two steel tube struts on each side of the fuselage, running from the bottom longerons to about sixty per cent of the length of the wing panels.

A fuel tank of 5-gallon capacity is fitted in the center of wings, out of the way and providing gravity feed. The capacity is sufficient to provide a cruising radius of nearly 200 miles.

The wings weigh only 18 pounds each side, covered and ready for use.

The spars are of the conventional type made from aircraft spruce. Wing tips are of steel tube with gracefully rounded ends. Ailerons hinge from the top of rear spar, thereby increasing control leverage and at the same time making aileron hinges handy for inspection and for removal. The covering is a special light plane fabric having the quality of the heavy fabric but weighing only 60 per cent as much. The Clark Y wing section is used.

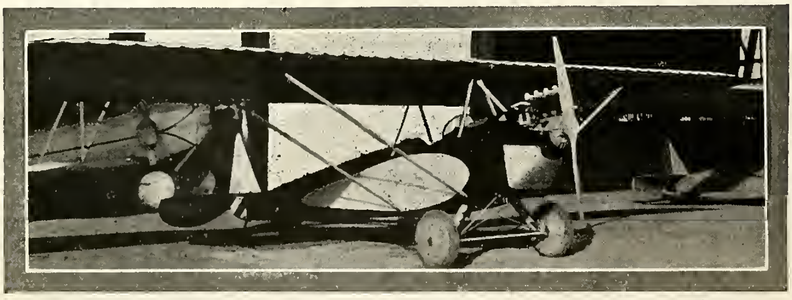
Fuselage is of modern steel tube construction. The welded type fuselage is used in all factory built Super Parasols. The bolted type, however, is recommended for home builders unless they are skilled welders.

Propeller is of wood, with a diameter of 4 feet 6 inches.

The ship carries 20 by 2 wheels as standard equipment, but 20 by 4 or 18 x 3 sizes can be used. The safety factor is calculated to be seven to one.

Specifications

Span	25 feet
Chord	4 feet 6 inches
Angle of incidence	1 degree
Wing area	110 square feet
Aileron area	10 square feet
Elevator area	5.2 square feet
Stabilizer area	5.5 square feet
Fin area	1.0 square foot
Rudder area	3.8 square feet
Length overall	16 feet 9 inches
Height overall	5 feet 10 inches
Weight, empty	260 pounds
Useful load	300 pounds
Gas capacity	5 gallons
Oil capacity	3 quarts
High speed	70 miles per hour
Landing speed	28 miles per hour
Cruising radius	200 miles



The Super Parasol single seater, powered with a 27 h.p. Henderson engine.

JAEGER INSTRUMENTS

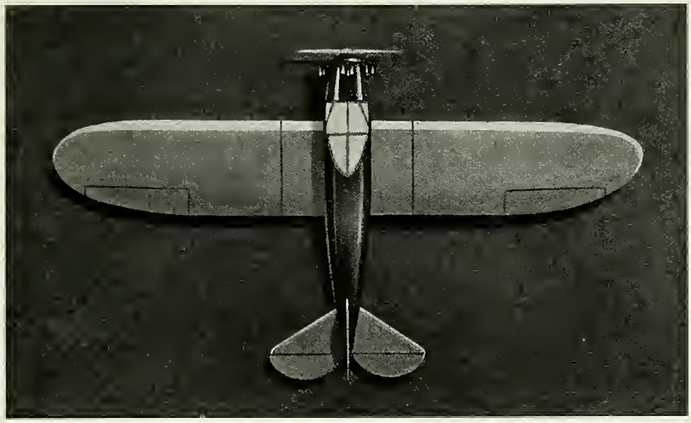
TWO new Jaeger models for aircraft use are the new 8-day chronograph (stop watch) and the new 8-day "time of flight" instrument, both manufactured by the Jaeger Watch Co., Inc., New York City.

The 8-day time of flight instrument is a double dial watch, the inner dial of which is a tabulating dial, recording the elapsed time the plane has traveled, time spent at landing fields, etc. The hands of the inner dial or tabulating dial are controlled by pushing a small button on the right-hand front side similar to a stop watch. It indicates the elapsed time in hours and minutes. The exact number of hours and minutes that the plane has been in the air can be ascertained at any time during the flight. The entire weight of this instrument is 11 ounces. It can be had in black dials with white figures or silver finish with black figures; or, if desired, the numerals and hands may be treated with radium paint.

The Jaeger 8-day chronograph is for use on mail, transport and military planes in checking the time passed at various stops, and also to determine the time required for a given run. It is designed to determine the rate of climb, speed, or other useful information in fifths of a second.

There are two scales: the outer scale indicated by the chronograph hand, which is graduated in fifths of a second, and the scale which is that found on a conventional watch. There is a small window in the dial which shows the number of minutes the stop watch hand has operated up to 30 minutes and repeating.

ALEXANDER



.32 BULLET

Real speed and travel comfort for FOUR PEOPLE AND A DOG, with baggage for all, are attained in the new Alexander .32 Bullet. This economical cabin ship may be powered with either the Wright J6 165 h.p. or Kinner 100 h.p. motor. If you want a cabin ship, ask for details and place your order now.

EAGLEROCK BIPLANE

OX-5—90 H.P.

J. S. Gehan, veteran pilot of Sioux Falls, S. D., flew home an OX-5. He sold it. Two weeks later he was in for another and ordered a third. He has tried all the OX-5 ships on the market and likes the Eaglerock best. In visibility, ruggedness, performance, ease of control and normal control in all positions it is close to perfection. It is the ideal ship for student training and for students after training. It can be used in commercial work whereas most training ships are one purpose planes.

HISSO "A" 150 H.P.

The standard Hisso "A" Eaglerock with government overhauled motor ready to fly away for $4,000, is by far the best seller we have. Performance at top speed compares favorably with ships selling for twice as much. It is one of the best balanced and most easily controlled Eaglerocks in the line. For advanced training, cross country work and general commercial flying it has no equal in low first cost and economical operation.

CHALLENGER 170 H.P.

In actual performance the 170 h.p. Challenger motored Eaglerock exceeded theoretical performance by a wide margin. Top speed proved to be 130 miles per hour instead of 119. It is a wonderful ship for demonstrating, sport flying and fast cross country work.

COMET 150 H.P.

The Eaglerock with Comet 150 h.p. motor is very popular because of its performance, smoothness and small gas consumption of the motor. Those who want flying ability and economy in the medium price class will appreciate the Comet motored Eaglerock.

WHIRLWIND 225 H.P.

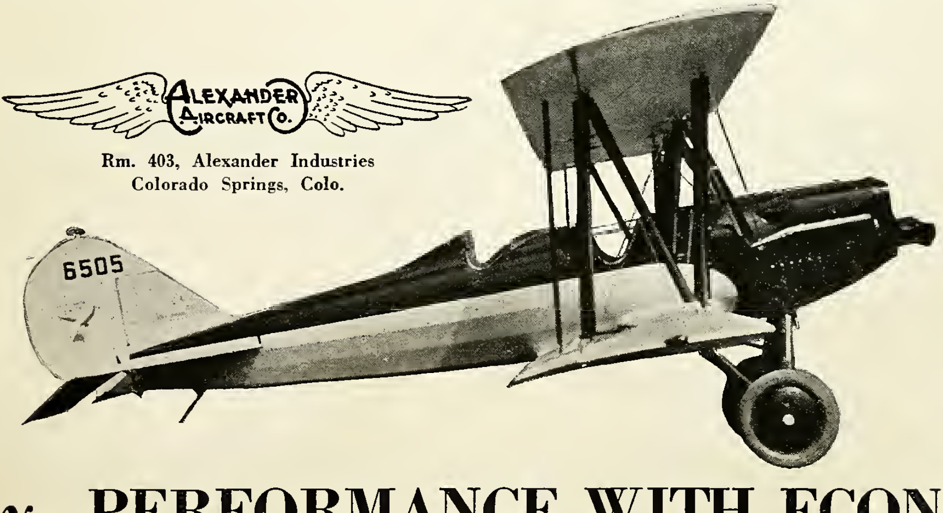
Powered with Wright J-5 225 h.p. motor the Eaglerock needs only to be flown to sell itself. It is speedy, has large carrying capacity and a comparatively slow landing speed. In performance and economy it is unexcelled in its class.

A Ship for Every Purpose

For schools and operators in the formative stage we recommend the OX-5 for student training; the Hisso "A" for advanced training and cross country work; the Comet, Challenger and Whirlwind for demonstrating, sport and real fast cross country flying.

ALEXANDER AIRCRAFT CO.

Rm. 403, Alexander Industries
Colorado Springs, Colo.



Truly—PERFORMANCE WITH ECONOMY

FACTORS IN ENGINE EFFICIENCY

INTERNAL combustion engines cannot realize their theoretical efficiency because of variation in the specific heat, which in theoretical studies is usually considered to be constant, according to a statement by Robert N. Janeway, a consulting engineer, in an address at a recent meeting of the Detroit section of the Society of Automotive Engineers.

Turbulence of the fuel and air mixture, which is credited with being a help in eliminating detonation, is considered by Mr. Janeway to be a function of the intake velocity rather than of combustion chamber design, and he holds that the form of the combustion chamber has greatest effect at full throttle and high speed. Its effectiveness is due to its influence in cooling the portion of the unburned gas during the combustion period, and that is influenced by the location of the spark plug. The best effect is found when the last of the mixture to be burned is contained in the thin space between the piston and cylinder-head design.

Since the piston forms one side of this space, piston cooling has a very great effect on detonation, said Mr. Janeway. Though the exhaust valve is often the hottest part of the combustion chamber, its effect on detonation can be overcome by correct location of the spark plug so that unburned gases will not pass over the valve during combustion.

To obtain smooth engine operation without loss of power, the volume of charge must be so distributed with respect to the spark plug position as to obtain as nearly as possible uniform acceleration in the rate of pressure rise up to the maximum rate, without excessive increase in explosion time.

COMMAND-AIRE TESTS

IN exhaustive tests recently conducted at Command-Aire Field, Little Rock, Ark., with three types of ships equipped with Hisso, Warner, and Curtiss OX-5 motors, the following average speeds at sea level were disclosed:

Rate of Climb

Curtiss OX-5..	90 horsepower...	550 feet per minute
Hisso	150 horsepower...	625 feet per minute
Warner	110 horsepower...	650 feet per minute

Top Speeds

Curtiss OX-5..	90 horsepower...	104 miles per hour
Warner	110 horsepower...	112 miles per hour
Hisso	150 horsepower...	120 miles per hour

Landing Speeds

Curtiss OX-5..	90 horsepower...	32 miles per hour
Warner	110 horsepower...	30 miles per hour
Hisso	150 horsepower...	35 miles per hour

DOUBLE END WRENCHES

BONNEY FORGE & TOOL WORKS of Allentown, Pa., have announced No. 33 Set of double end box wrenches, nine wrenches with openings from 7/16 to 15/16 inch, put up in a metal carrying case.

These double end box wrenches are designed with a double hexagon opening, allowing secure gripping of nuts with very little handle movement. It takes but a twelfth turn of the handle to remove a nut.

TEST FLIGHTS OF THE ABREU DETACHABLE AIRPLANE

By HOWARD V. WALDORF

A NEW method of aircraft construction was introduced when the Abreu "detachable" airplane was recently test flown at the airport at Alameda, California. The plane is constructed in two units, the engine and fuel tanks in one unit, and the remainder of the craft in the other. The two units are locked together by eleven safety locks which are released by pulling on a lever in the pilot's compartment.

In the first test of the new design, which is the invention of Joaquin S. Abreu, San Francisco, a two-place open, externally braced parasol monoplane was used. The plane and the locking arrangement were designed and constructed by engineers of the Aeronautical Engineering Co. of Oakland, California, around the idea furnished by Abreu.

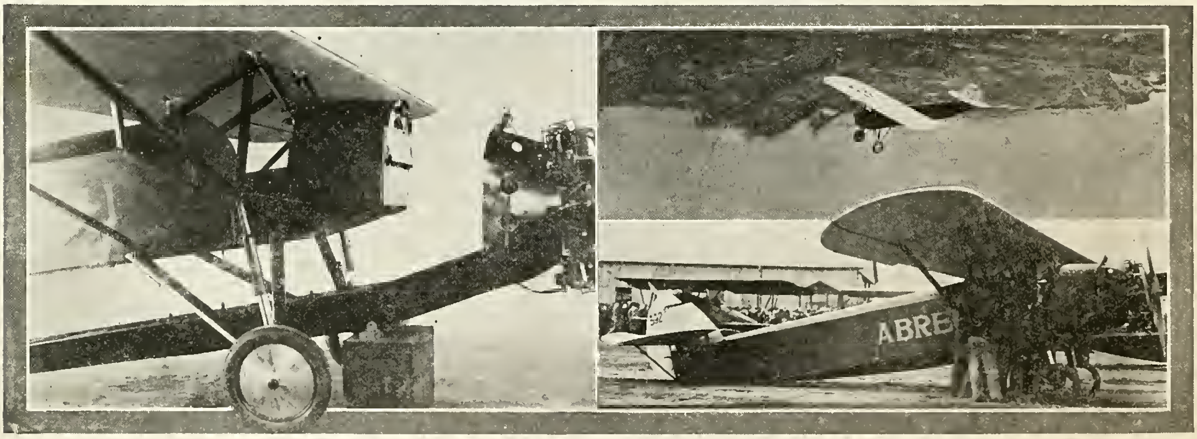
Objects of the two unit method of construction are increased safety in case of fire in the air or motor failure over rough terrain and speeding up of air transport service through the changing of engine units at division points in place of transferring cargoes from one plane to another. Gliding range is greatly increased by the elimination of weight and landing speed reduced to less than 20 miles per hour.

The wing span of the test plane is 38 feet, and overall length 28 feet. Solid spruce spars and built up spruce and plywood ribs are used with an ash leading edge milled to conform to the curve of the forward portion of the surface. Steel tube drag bracing is used in place of wire or tie rod bracing usually employed. The wing struts, cabane struts, landing gear struts and stabilizer braces are constructed of streamline steel tubing. Fuselage and control surfaces are of welded steel tubing. Push-pull control is used.

Three safety locks are used on the motor mount, and four on each side of the bottom of the fuselage, eleven in all. To distribute the weight to be released and to insure the correct balancing of the remainder of the craft following its release, the engine and tank unit extends back to within a few feet of the tail skid.

In the test plane a Le Rhone engine was used. The plane was piloted by Reed Vowles, Oakland transport pilot, who has had experience with gliders. Climbing to an altitude of 5,500 feet over the bay adjoining Alameda Airport, he turned off the ignition switch and pulled the release lever. The engine and fuel tank unit dropped away, transforming the craft into a glider. For more than fifteen minutes, he glided the craft over the airport, before heading for the runway. A crowd of children running toward the incoming plane, forced Vowles to nose it into the sand on the beach. The craft was only slightly damaged.

Engineers who designed the plane are W. King Jenkins, Earl Hillburn, Brint Edwards, and Cliff Dorwin. They declare that the design is more adaptable to a tri-motored plane than to single-engined craft.



The detachable engine of the Abreu plane; (upper right) gliding without engine.

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APPLICATION OF ADVANCED METHODS TO AIRPLANE STRUCTURAL ANALYSES

By
Dr. Michael Watter

Dr. Michael Watter, Design Engineer, Chance Vought Corporation.

THE importance of the use of advanced methods of structural analyses not only from standpoint of structural safety, but also as a means of evolving new forms cannot be too greatly emphasized. This discussion outlines briefly some results from the writer's experience and, in connection with desirability of finer methods, urges closer coördination between aerodynamical facts and structural requirements. Certain present requirements are criticized, and suggestion is made to revise the conception of load factors in their relation to individual members.

If economy is a purpose in other branches of engineering, it is a necessity in aeronautics. The performance of any airplane is a function of its weight, and military and commercial airplanes alike must be built as light as possible in order to allow greater military load in the case of the former and greater pay load in that of the latter. Because the efficiency of any structure hinges on its uniformity of strength and because comparatively small factors of safety are allowed in airplane structures, it is imperative that the designer should know, with the precision afforded to him through the finest methods available at present, the distribution and nature of working loads. This necessity is not based solely on the requirements of structural safety or economy, but arises as well from its function as a powerful means of evolving new and more perfect forms which may be desired because of performance or service requirements. The complexity of airplane structures necessitates the use of advanced methods of structural analyses in order to be able properly to determine the distribution and kind of loads.

Although in other branches of engineering the method of calculation would more strictly apply to determination of stresses, in aeronautical engineering this problem is further complicated by evaluation of acting loads.

Inasmuch as structural analyses of the airplane are intimately related to an accurate knowledge of aerodynamic and dynamic loads acting on the structure, this paper necessarily deals not only with advanced methods of purely structural analyses but also with more rigorous requirements coordinated with known aerodynamic data. Application of the Berry method, the "least work" theorem, the Williot diagram, method of elastic weights, the method of work, etc., might well be wasted if the engineer did not take into account actual condition of loading or if, in dimensioning the sizes of members, he neglected the real meaning of the factor of safety.

It is beyond the scope of this paper to dwell on relative merits of statically determinate or indeterminate structures. Although it is true that in case of statically determinate structures the loads in different members can be obtained readily and with aid of definite rules often obviating the necessity of simplifying assumptions, with improved control and knowledge of properties of materials and fine workmanship in airplane construction, the behavior of a statistically indeterminate structure can be very closely analyzed by available methods handled by an experienced engineer. It is also well to point out that the cases of ideal statically determinate structures are never met in practice and that in a number of cases, the service requirements are such that an engineer is forced to adopt more complicated arrangements.

It is always tempting to make a simplified assumption, but it will be found that finer analyses will give a much more accurate picture of the load distribution, and thus lead to a more economical design of the structure.

By way of illustration, I cite the case of a normal type single-bay biplane cell intended to be used on the latest Vought two-seater fighter.

Both upper and lower wings are parallel, have no sweepback and are arranged with a stagger of about 12.9 degrees. The flying wires are not in the plane of the beams but are brought slightly forward. The outboard strut is a conventional N-strut arrangement.

If an engineer has never made a "least-work" analysis, he will be tempted to make few assumptions, attempting to be reasonably on the safe side. Since the redundancy is caused by the N-strut and since there is a comparatively small stagger, it would appear that in case of high incidence condition the anti-drag component on the lower wing would be taken by the internal trussing of the wings and the lift reaction could be resolved in the respective members of the N-brace. It would be safer to assume that the total air reaction at the lower wing strut points is carried by the N-brace to the upper wing, but experience will prove that this assumption is fallacious.

The truss was solved on the basis of these assumptions and the following loads were arrived at:

	pounds
Compression in the front beam	= —17,620
Load in the front flying wires	= +13,500

Since it is our policy, however, to attempt to analyze the structure as closely as possible, a "least-work" analysis was made, assuming as the redundant member the front strut of the N-brace and the loads obtained were as follows:

	pounds
Compression in the front beam	—12,516
Load in the front flying wires	+10,105

Similarly the loads in the upper anti-drag bracing proved to be considerably less than a simple analysis would seem to indicate. On the other hand, the loads in the rear flying wires and rear beam in case of a simplified analysis would be considerably underestimated. This is a very good illustration of how much it is possible to economize on the structure if a finer method of analysis is resorted to.

In connection with this, I should like to bring up a point in regard to present requirements in the case of statically indeterminate structures. These requirements specify that when allowance must be made for redundant members the loads shall first be computed for the statically determinate system obtained by neglecting the redundant members. The effect of the redundant members shall then be considered by the method of "least-work" or by some other method, and the net loads obtained. In computing these net loads, the effect of the redundant members shall be increased or decreased 25 per cent, whichever is the more conservative, in order to allow for play in joints, variation in cross sections, etc. It must be pointed out, however, that the loads obtained by means of a "least-work" analysis, or other precise method, will be the same irrespective of which members were assumed to be redundant, but widely different in case of simple analysis when different redundant members are assumed to be inactive. This leads to an uncertainty in deciding on the above 25 per cent correction because, for instance, in the case illustrated above, the assumption that diagonal brace of the N-strut is redundant would lead to somewhat higher loads in the front beam and flying wires, and the design loads consequently should be increased. It would be desirable to have this rule made more specific, because in its present form it is ambiguous.

Since the purpose of this paper is mainly to illustrate cases and problems actually met

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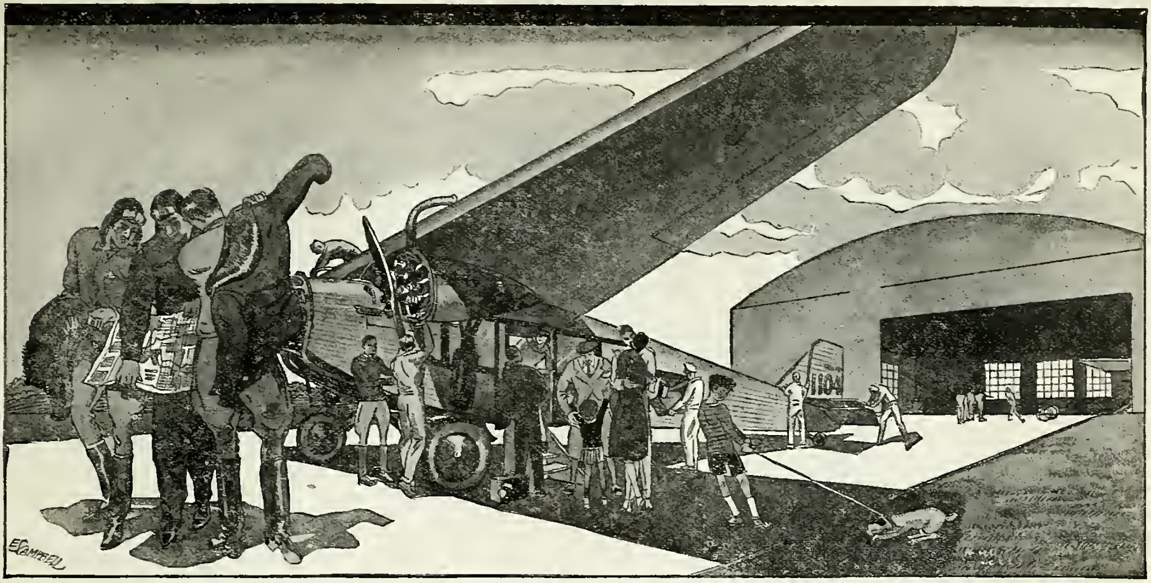

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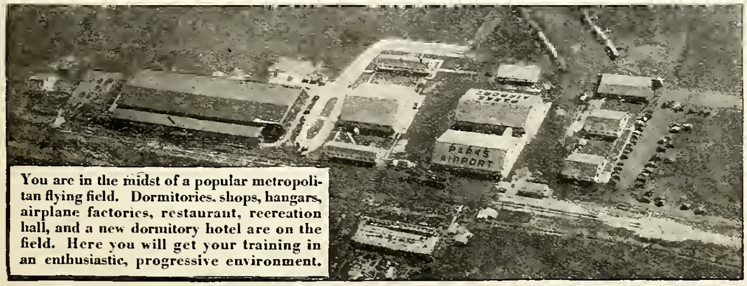

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(Continued from preceding page)

in the author's experience, the question of design of beams and shallow trusses will not be treated in detail, because, besides classical treatises, there are excellent papers available on the subject of combined axial and transverse loading and on the use of the methods of work, Williot diagrams and elastic weights in design of trussed beams.

In practice it will be found that, because of the comparative complexity of the latter problem, there will be a great deal more information available on stresses in individual parts of a trussed beam than on an ordinary web beam. This is of course partly due to the method of analysis necessary in case of trussed beams and partly because the web beam is usually proportioned by merely obtaining the maximum bending moment and distance between points of inflection. A word of warning may not be out of place that there may be a case in design of a web beam where the design section may not be at the point of maximum bending, but at the point of the next largest drag-load component.

If the engineer has available the true bending moment diagram with a diagram of axial loads drawn in their proper relation to the sections of the beam, he will be able to judge the condition and verify by calculation sections which appear to be more stressed than the section at the maximum bending moment.

In practice it will quite often be found that the shop has made small errors here and there which are not sufficiently serious to warrant rejection of the beam and yet are such that the engineer may be in doubt whether the section in question is sufficiently strong. The diagram ot the nature suggested will be of great help to him in such a case.

The author has evolved a graphical method of constructing the bending-moment diagram for a beam under combined axial and transverse loading which he has found of great help in his routine experience. Only a brief outline of it will be given here. The advantages claimed for it lie essentially in the fact that complete bending-moment curve is readily drawn by means of simple graphical construction.

Draw the beam *AB* to any convenient scale and, on the vertical lines passing through the points of support, lay off downward the values of M_A *and* M_B (here the same notation and method are used as in Pippard and Pritchard's book "Aeroplane Structures"). Join the two points thereby obtained and project the point of intersection of this line with the vertical line passing through the middle of the beam on any arbitrary vertical line drawn on either side of the bay. On figure 1 this would be the line *ab*. Lay off on this line vertically upward the value of W/u^2 to a definite scale. At the points *a* and *b* draw the angles 2∞ where $\alpha = 57.3° \frac{l}{2}\sqrt{\frac{P}{EI}}$. Extend the line *AB* until it intersects the line *b*0 and *b*8. The segments thus obtained give the magnitude of *B*. By drawing two horizonal lines through the points 0′ and 8′ until they

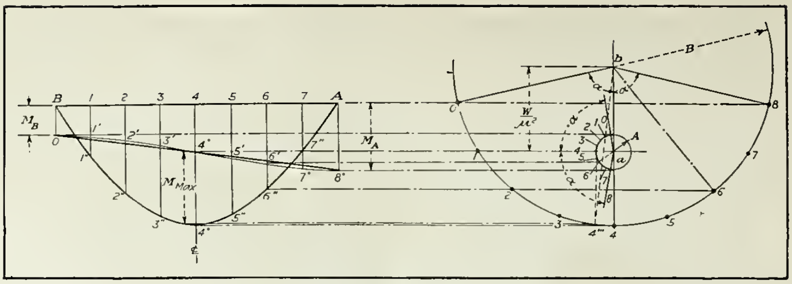

Fig. 1. Bending-moment curve for a beam under axial and transverse loading.

intersect the lines *a*0 and *a*8, the magnitude of *A* may be obtained. It must be observed that *b*0 and *b*8 are drawn by measuring *a* from the vertical line, while *a*0 and *a*8 are drawn by measuring it from the horizontal line. With the radii thus obtained, draw two circles *B* and *A* and divide the length of the beam and both segments into the same number of equal parts. Through points 1, 2, 3....2*m* of the segments draw lines parallel to the axis of the beam, and their intersection with corresponding vertical lines will determine points 1′, 2′, 3′....2′*m* and 1″, 2″, 3″....2*m*″. It can be proved that the distances 1′ 1″, 2′ 2″, etc., give the bending moment at the corresponding points in the scale in which W/r^2 was originally drawn.

To locate the maximum bending moment, lay off on the line 44″ front 4‴ such that 44‴ is equal to *A*, and join the point 4‴ with the center of circle *B*. Project the point of intersection of this line with the circle *B* on the curve 0″, 1″, 2″....2*m*." The corresponding ordinate of the bending moment diagram gives M_{max}. Since there are two such points of intersection, it must be understood that the point in question is on the side of the diagram where curve 0′, 1′, 2′....2*m*′ mounts upward.

In connection with the mention of the cell arrangement, it is interesting to point out one novel feature which was incorporated in the center section. Although it was believed that the wing arrangement was the most advantageous from combat and formation flying viewpoints, it was nevertheless felt that for gunnery and general use a large center section was undesirable because of the blind angle resulting from it.

In order to retain the cell and yet to improve the upward and forward vision of the pilot, attention was concentrated on the center section. Since ordinarily the location of the rear spar limits the depth of cutout, it was decided to change the standard structure of the center section by employing two rear beams crossed to form the letter X, which would make it possible to double the depth of the normal cut-out. This resulted in the Vought "vision" center section which was first incorporated in the Vought special observation airplane submitted to the U. S. Army and made its first actual appearance on the Navy 02U-2 airplanes. Figs. 2 and 3 give the standard and vision type center sections, respectively.

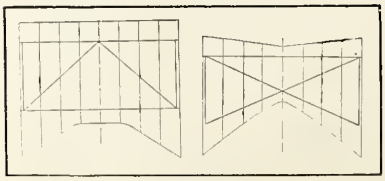

Fig. 2. Regular center section and Fig. 3. (right) "Vision" type center section.

The first center section was metal with latticed beams and channel-type ribs. Because of the type of the structure and in order to improve vision, the center section was built in such a way that the original airfoil was approximately preserved through the span, and therefore the beams were tapered with the lowest depth at the center. The diagonal beams besides were not symmetrical about the mid-point. This presented almost a general case of a non-uniform beam under combined lateral and axial loads in which the lateral load varied throughout the length, the axial load being applied eccentrically and the taper reversed in the sense that the depth of the beam decreased toward the center.

In analyzing the structure, the following method was adopted. The axial loads were obtained from the "least-work" analysis of the cell. In view of the uncertainties of the lift distribution over the span, it was felt that it was sufficiently accurate to employ the following assumptions. The load was considered to be a distributed load along the beam. The load per inch run was taken as proportional to the respective chord length. The proportion of this load on each beam was then calculated by means of rib loading curves; the front beam taking the load from leading edge to a point half-way to the middle beam, the middle one taking it from there to a point half-way to the rear beam, and the rear carrying the load from this mid-point to the trailing edge. In addition to the non-uniform loading and a tapered beam, there were also to be considered the eccentricities at both ends where the axial load was applied. The beams were analyzed graphically by drawing primary bending moments due to the axial and distributed loads. Then the primary *M/I* curve was drawn and deflection determined from it in order to obtain the secondary bending moment. In calculating the deflection in order to account for fact that the beam in reality was a shallow truss, the value of E = 10,400,000 pounds per square inch for duralumin was taken as only 8,000,000 pounds per square inch. After the secondary bending was obtained,

(Continued on next page)

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the new deflections were determined and the process repeated until the beam appeared to approach the condition of equilibrium, at which point a final bending-moment curve was determined which was used in calculating the stresses in the beam. In order to design the diagonals, the shear was obtained from the slope of the final bending-moment curve.

In order to verify the assumptions used in the design of the beams, the front beam was tested under simple bending and value of E obtained from the observed deflection. The figure obtained was 8,400,000, which was quite close to the assumed value.

Split-Axle Chassis. Another example of a new structural form which necessitated the use of rather elaborate analysis is the split-axle type chassis which was designed for the Vought Corsair. Because of certain service requirements, it was felt desirable that the wheels should move in the vertical plane only and that the chassis should be independent of the wing structure.

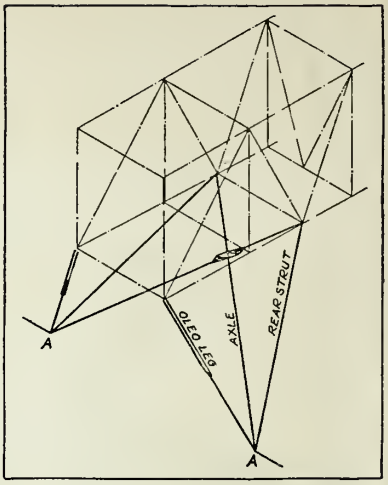
Despite the simplicity of the final form of the chassis, it must be stated that it was arrived at only after considering several tentative designs. The present chassis structure consists of a total of six members. Each wheel is supported by a front oleo leg of spring-oleo type, a diagonal axle and rear strut, these two being in the same plane. Since the axles cross in the same plane, one is provided with a ring structure to allow for an independent movement of either of the two wheels. When the front oleo leg shortens under the load, the rotation occurs about the transverse axis going through the upper attachment of the axle and rear strut. The lower rear-strut attachment is such that theoretically it does not take any bending caused by the part of component in the load in the plane of the rear struts.

In view of the complexity of the problem, the following assumptions were made:

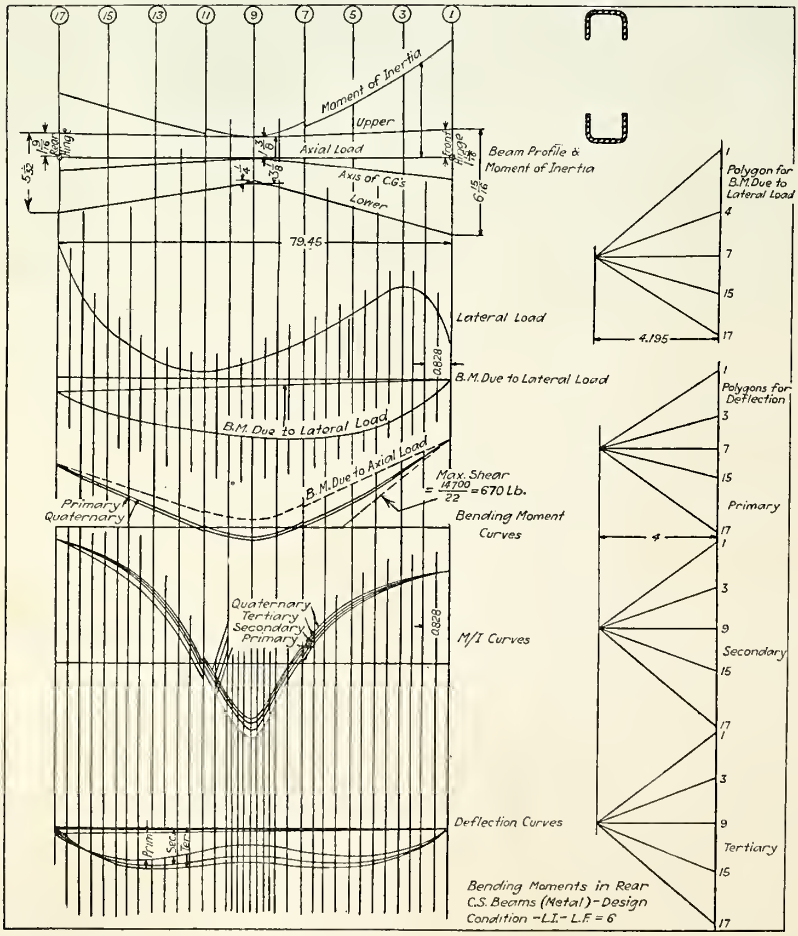
(1) The loads applied to the frame by the wheels were resolved at point A into axial loads in the front strut, rear strut and axle; a bending moment in the axle from the cantilever load in the plane of rear strut and axle, and a torsional couple in a plane perpendicular to the plane of rear struts and axles.

(2) The fact that the axle and rear strut are not perpendicular to the plane of the torsional couple was neglected, and sections were taken perpendicular to the longitudinal axis of the member.

(3) In calculating the angle of twist of the rear strut, an elliptical section of the same major and minor axes has been substituted for the streamline section actually used.



Landing gear structure diagram.



Graphic determination of the bending moment due to transverse and eccentric axial loads on the rear beam of the "vision" type center section.

For convenience, the bending moment caused by the component of the load in the plane of the rear struts and axles was called the primary bending moment; that resulting from the method of attachment and the torsional couple at the lower point A was called the secondary bending.

In solving for the secondary bending and torsion in the rear struts and axles, it was found that standard equations of statics and least work were inadequate to solve the problem, and the question arose as to what other equation or equations might be lacking. By studying the structure, however, it became evident that the lacking equation was the expression of the equality of the torsional deflections of the rear strut and axle.

In connection with this stress analysis, it became necessary to find an expression for the angle of twist of a streamline tube, and study was made of the problem. The difficulty of this problem lay not only in finding a suitable formula for the angle of twist, but also in the lack of information on the modulus of rigidity of chrome-molybdenum tubing. It was felt, however, that for the latter a value of 12,000,000 pounds per square inch should be sufficiently close for practical purposes. The problem of finding a suitable formula for the angle of twist and the shearing stress of a streamline tube was approached in several ways, and since the theoretical solution presented insurmountable difficulties, several methods were resorted to.

The first method (and that actually used in the analysis) was to assume instead of a streamline tube an elliptical tube whose major and minor axes were equal to the axes of the streamline tube. Since to the writer's knowledge there is no expression of the angle of twist of a hollow ellipse available, a formula was derived by analogy with a circular tube. The following nomenclature was employed:

(*Continued on next page*)

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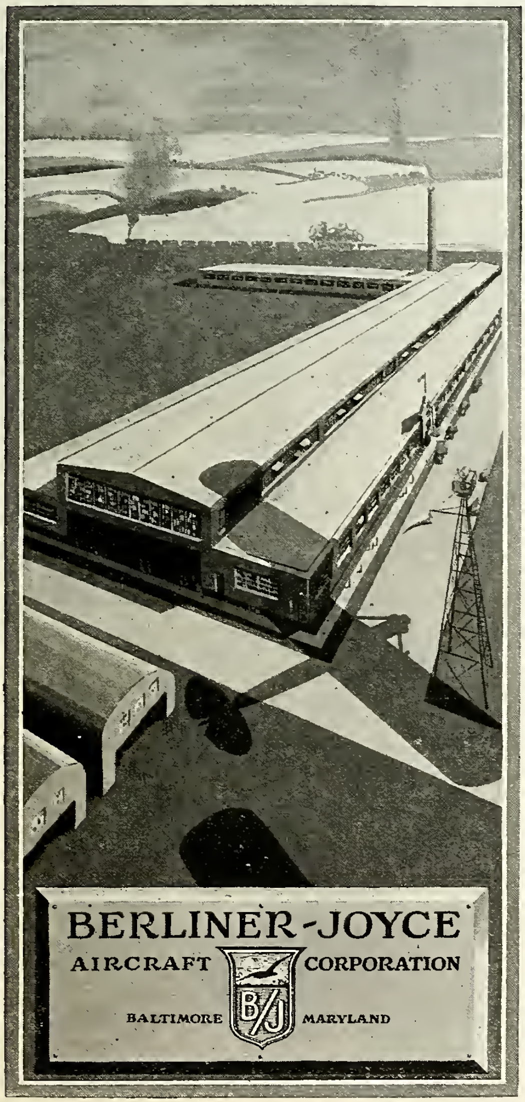

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William H. Miller, designer of the wind tunnels at Massachusetts Institute of Technology, later in charge of Curtiss research laboratory;

Earl P. Osborn, formerly stress analyst, then in charge of propeller department, then chief of Curtiss structural section;

Harold A. Backus, formerly chief metallurgist and general engineering consultant on materials, processes and finishes for Curtiss;

Thomas E. Pell, formerly factory superintendent of the Naval Aircraft Factory at Philadelphia;

Henry A. Berliner, designer and builder of the Berliner helicopter and monoplane, and President of the absorbed Berliner Aircraft Company.

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(Continued from preceding page)

θ = angle of twist in radians
f_s = shearing stress
a = major axis
b = minor axis
subscript 1 indicates outer dimensions
subscript 2 indicates inner dimensions
T = torsional moment
l = length
G = modulus of rigidity
A_1 = area enclosed by outer boundary of section
L_0 = length of the median line.

The angle of twist of a solid elliptical section as given in Morley's "Strength of Materials," page 295, is:

$$\theta = \frac{16}{\pi}\;\frac{(a^2+b^2)}{a^3b^3}\;\frac{Tl}{G}$$

In case of a hollow circular section (D_1 and D_2, respectively, outside and inside diameters),

$$\theta = \frac{32}{\pi}\;\frac{1}{(D_1^4 - D_2^4)}\;\frac{Tl}{G}$$

so that the twist of the hollow ellipse may be written by analogy as

$$\theta = \frac{16}{\pi}\;\frac{Tl}{G}\left[\frac{1}{\dfrac{a_1^3b_1^3}{a_1^2+b_1^2} - \dfrac{a_2^3b_2^3}{a_2^2+b_2^2}}\right] \ldots\ldots [1]$$

One of Bach's works gives the following formula for the strength of a hollow ellipse which was used to determine f_s:

$$f_s = \frac{16\,T}{\pi}\left[\frac{b_1}{a_1b_1^3 - a_2b_2^3}\right] \ldots\ldots\ldots [2]$$

In order to check [1], several other methods were used and it is interesting to review them here.

In Prescott's "Applied Elasticity," on pages 165 and 166, are given formulæ which hold true for thin tubes; that is, those where wall thickness is small compared to the curvature of the inner boundary of the section. This is the case for streamline tubular sections except at the trailing edge. The expression of the angle of twist is

$$\theta = \frac{TlL_0}{4GtA_0^2} \ldots\ldots\ldots\ldots\ldots [3]$$

and for shearing stress:

$$f_s = \frac{T}{2tA_0}$$

It was found from the experiments, however, that instead of taking A_0 as the area inside the median line as recommended by Prescott, the formula gave better results if area was taken within the outer boundary.

$$f_s = \frac{T}{2tA_1} \ldots\ldots\ldots\ldots\ldots\ldots [4]$$

On page 168, Prescott gives the formula for a tube bounded by two similar ellipses, which means that the wall thickness is not constant. However, using the values of equivalent ellipse (that is, the ellipse having the same area and polar moment of inertia as the streamline tube) this formula gave fairly good results.

$$\theta = \frac{2\;Tl}{\pi\;G}\;\frac{(a_2^2+b_2^2)\,b_1}{a_2^3b_2^3t} \ldots\ldots\ldots [5]$$

Another formula for the angle of twist was obtained as follows: For a solid ellipse the angle of twist in terms of fiber stress, as obtained by solving the equations for T and θ in Morely's work, page 295, is

$$\theta = \frac{f_s l}{G}\;\frac{(a^2+b^2)}{a^2b}$$

Assuming that it holds true for a hollow ellipse also and substituting for f_s the value in Equation [2],

$$\theta = \frac{16}{\pi}\;\frac{Tl}{G}\;\frac{(a_1^2+b_1^2)}{a_1^2(a_1b_1^3 - a_2b_2^3)} \ldots\ldots [6]$$

Tests. In order to obtain data on streamline tubing in torsion both for the purpose of checking the foregoing formulæ and to obtain some idea as to allowable shearing stress, two pieces of 1.25 × 3 × .064-inch chrome-molybdenum streamline tubing were tested in torsion. Tensile tests of two specimens cut from the same tube gave the following properties: Ultimate strength 102,000 pounds per square inch; elongation in 2 in., 14.2 per cent.

The average angle of twist of the tubes in radians under a moment of 4000 inch-pounds was .0172. The angle as calculated by the formula given above is as follows:

Equation	[1]	[3]	[5]	[6]
Angle of twist...	.0191	.0191	.0181	.0171

Using in Equation [3] the dimensions of an equivalent ellipse, the calculated value of θ is .0176.

Based on these two tests all formulæ seem to give fairly accurate results. The torsional modulus of rupture as determined from the test for this tubing was: Equation [2], 51,000 pounds per square inch; Equation [4], 41,700 pounds per square inch.

Since the torsional modulus is a function of the D/t ratio, it is rather hard to say which formula gives closer results. It is hoped that more experiments will be carried on torsion of streamline and oval tubing, when it will be possible to obtain accurately the variation of the modulus of torsion with the D/t ratio.

Because of the wide use of streamline tubing, the main properties of any standard streamline tubing of any practical fineness ratio are given below:

$$I_{\text{major}} = 0.0838\;D^2t(3L+D)$$
$$I_{\text{minor}} = 0.0960\;L^2t(L+3D)$$
$$A = 1.635t(D+L-2t)$$

y = distance of the minor axis from L.E. = $0.485L$.

The use of finer methods of analysis should not be limited to the major structures since the analyses of detail have still greater bearing on the strength and economy of the structure. Details are points of concentrated stresses and are often more susceptible to wear and deterioration than the main members of the structure. Greater economy and better uniformity can be attained if every detail is carefully analyzed and designed.

A rib which is so often proportioned by simple experience can be much better designed if a truss analysis is made from the rib loading diagram and the member dimensioned by assuming a fixity of 2 and, for wooden ribs, the strength of glue joints between 250 and 300 pounds per square inch.

Careful design and analysis of structure, however, can be economically justified only if the requirements are coördinated with actual loading conditions encountered in the service of the airplane. This hinges on our knowledge of aerodynamical facts and service conditions, close control of properties of material and good workmanship. The problem of materials and workmanship will not be discussed here, but the coördination of aerodynamical and service facts and design conditions is a vital point in structural analysis and its importance should be stressed. A number of failures of different parts of the airplane occur on the ground, and very seldom is an adequate explanation found. A case often met in practice is the failure of cabane struts in bad landing. A plausible explanation would seem to lie in the inadequacy of the present side load condition. The present specifications do not make any mention of how the structure should be assumed to be balanced to react on the external loads nor of the members which should be considered in this condition. It would appear logical to assume that the side loads are balanced by inertia forces of equal total magnitude acting in the opposite direction and rotative inertia forces opposing the rotation of the airplane about its own center of gravity. The latter forces are proportional to the weights and also to the square of their distance from the center of gravity of the airplane. Thus knowing the loads and reactions, one is able to make a careful analysis of the structure. A similar analysis was made by the writer, and though somewhat elaborate, it led to interesting results. It indicated that it is very possible that cabane members and certain members in the fuselage truss may be designed by this condition, and because of that, it is suggested that the side load landing condition be revised and made more accurate and specific. It is believed that requirements should not be made too elaborate but that they nevertheless must more nearly approach the actual condition and should specify if possible definite means of analysis. In connection with the requirements for the landing condition, a new condition should be added to protect the crew and passengers in case the plane should completely turn over in case of bad landing. It is the author's practice always to analyze the cabane and center section structure for this tipping over condition and the load factor which he uses is 4. It may be safer to increase it to 6, but whatever the factor may be, it must be ample to protect the occupants of the plane from possible failure of center section structure or the cabin superstructure.

As regards the flying conditions, the nose

(Continued on next page)

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dive condition should be changed to represent more closely the aerodynamical facts, inasmuch as this condition is very important for military combat airplanes. We all are acquainted with the present requirements and specifications for analyzing the nose dive condition and with aerodynamical facts of the real nature of loads and couples taking part in nose dive.

A more accurate analysis can easily be made, and though it entails slight complication, it is nevertheless worth while to determine the structural strength of the craft by making full use of available aerodynamical information. The wind tunnel test of the airfoil used gives the necessary moment coefficient to obtain the couples on the wings:

$$M = \rho C_m S V^2 c$$

where ρ = density

C_m = moment coefficient

s = wing area

c = chord

V = terminal velocity

The drag loads must be obtained by writing the equation:

$$D = \frac{C_{Dw}}{C_{Dp} + C_{Da} + C_{Dw}}$$

where D = drag of wings

C_{Dw} = drag coefficient of wings

C_{Dp} = parasite drag coefficient

C_{Da} = drag coefficient of propeller

W = gross flying weight

To obtain the magnitude of the terminal velocity V in the drive, one must obtain the magnitude of C_{Da} from available information on the propeller used and write the standard equation

$$\rho\ (C_{Dw} + C_{Dp} + C_{Da})\ SV^2 = W$$

For planes which are not supposed to be stunted, the factor of safety must be sufficiently high to preclude any possibility of failure in the air, but it does not have to prevent the members of the structure from taking permanent deformation. On the other hand, planes which because of their service requirements must be dived repeatedly must have a factor of safety sufficiently high to keep the stresses in all the members of the structure within the elastic limit of the material.

In aeronautical structural engineering, we deal with load factors which are actual overload factors multiplied by the factor of safety. Though this is a logical procedure, it is well to keep in mind that it gives only a general factor to be used in calculations of design loads and that in the actual proportioning of the members one must take into consideration the nature of stresses and the service conditions. This is particularly true in the design of details, but its importance should not be lost sight of in proportioning the major members of the structure. The actual factor of safety is equal to the breaking load of the structure divided by the maximum possible load on the structure in flight.

The factor of safety, generally speaking, must take care of:

(1) Inaccuracies of calculations and overload assumptions.

(2) Possible increase in weight in future.

(3) Deterioration of the material with time.

(4) The condition that at no time of normal service conditions shall actual working stresses exceed the elastic limit of the material.

In design of details there are few more conditions which should not be lost sight of by the design engineer, namely:

(5) Variations in the material and inaccuracies in workmanship.

(6) Defects in the material.

(7) The effect of vibrations, reversal of loads, etc.

Conclusions. It is hoped that the examples of the structural problems given in this paper and met in routine practice will emphasize the importance of finer methods of calculations. A closer coördination of aerodynamical data and structural requirements will still further perfect our methods of structural analysis and thereby will lead to mechanical and aerodynamical perfection of airplanes. Structural failures in the air of well designed planes are almost unknown, and if such failures occur, their origin is almost invariably traced to causes other than imperfection of present methods and requirements. But the future development hinges not only on safety which can always be obtained at the sacrifice of performance but on economy as well.

Economy and efficiency of structure are the paramount problems in the design of the airplane of today and tomorrow.

The writer is indebted to the Chance Vought Corporation for permission to use the examples of structures described in this article, to Mr. Charles J. McCarthy for his criticism and comments, and to the writer's assistants, Messrs. George W. Brady, and Charles R. Strang, who performed many of the actual calculations which are mentioned.

(Paper presented at the National Aeronautic Meeting of the American Society of Mechanical Engineers, St. Louis, Mo., May 27-30, 1929.)

NEW ALBATROSS MONOPLANE

THE first of the new "Albatross" B-1 monoplanes designed by Charles Rocheville and built at the Albatross airplant plant, at the Long Beach Municipal Airport, California, was delivered to the Ebrite Aero Corporation, with headquarters also at the Long Beach airport. The ship is an eight-place cabin monoplane powered with a Pratt and Whitney Wasp engine. Ebrite has given the plane a thorough testing, making a two-day trip, with a full compliment of six passengers and two pilots to a copper mine in Mexico, where on taking off they were confronted with a 365-foot runway over rough ground.

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Specifications

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Height overall	11 feet
Span	56 feet
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Useful load	2,250 pounds
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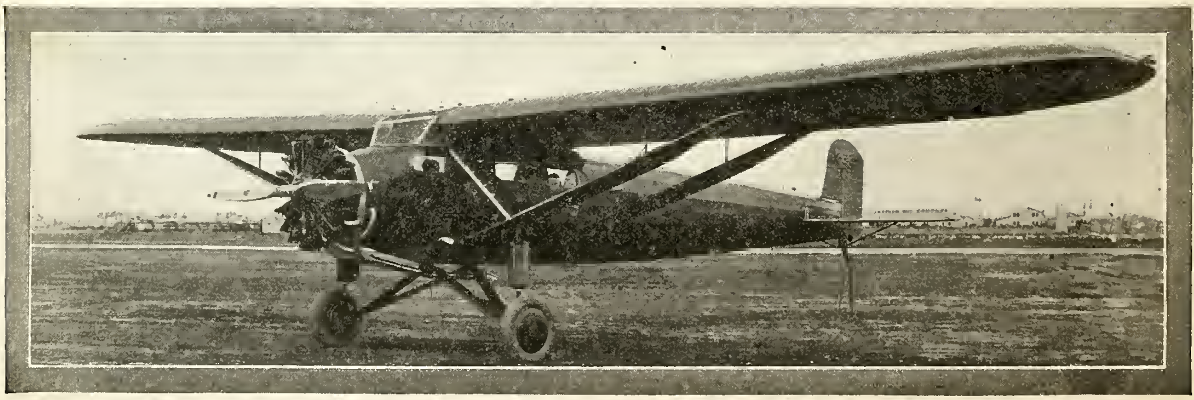
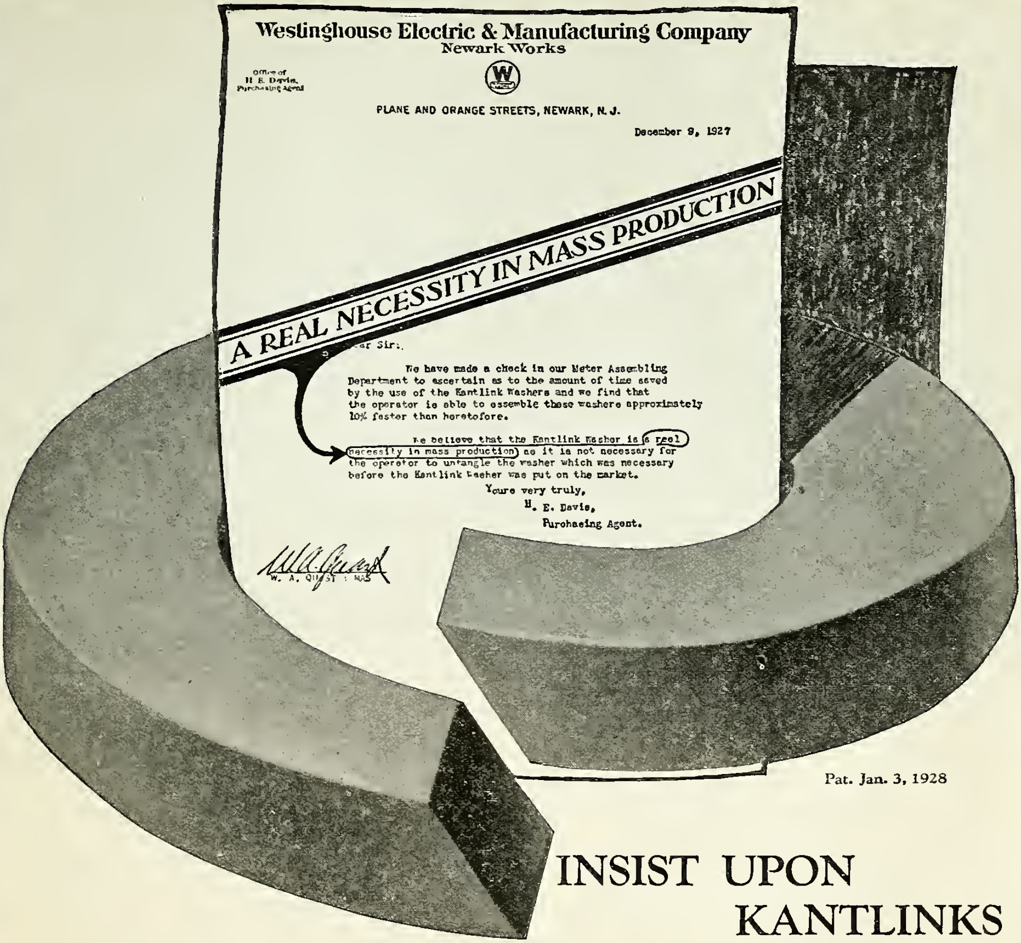
Power loading	9.07 pounds per horsepower
Fuel capacity	165 gallons
High speed	145 miles per hour
Cruising speed	115 miles per hour
Landing speed (full load)	40 miles per hour
Take-off run	250 feet
Landing run (without brakes)	250 feet
Service ceiling	22,000 feet
Cruising range	1,000 miles
Endurance range	8 hours



Albatross B-1 monoplane designed by Charles Rocheville and powered with a Pratt & Whitney Wasp engine.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TESTS OF NEW LANDING LIGHT

THE installation and operation of a new type of landing lights have been the subject of recent experimental work conducted by Lieut. James Doolittle of the Guggenheim Fund for the Promotion of Aeronautics, assisted by Crawford McGinnis, engineer of the Pyle-National Company.

New 6-inch landing lights developed by Pyle-National have been used in the tests, which included determinations of the effect upon performance of various mounting methods and locations of the lights on the wing. Lieut. Doolittle has been using a Vought Corsair in these tests.

Lieut. Doolittle reports that these landing lights were directly responsible for his being able to avoid a serious crash a short time ago. He had a close call in a fog landing after having been lost over New York for more than an hour. He was able to see a tree trunk directly ahead in time to turn the ship. Before this he had been able to stay above the tree tops through the use of the landing lights. Lieut. Doolittle has tested the new lights out thoroughly on night landings and has found them very satisfactory.

Flight tests are expected to produce information on the relative merits of several different locations of landing lights and to give definite data on the performance of high speed ships with and without lights. Preliminary data confirms the previous experiences of Pyle-National engineers which showed surprisingly little reduction of top speeds when the lights were correctly mounted.

Pyle-National 6-inch landing light.

MACWHYTE PRODUCING INTERNALLY LUBRICATED WIRE ROPE

THE Macwhyte Company of Kenosha, Wisc., has introduced a new internally lubricated wire rope. A high grade grease is made liquid with heat and applied to the individual wires of the rope during fabrication. This grease hardens when it hits the cold wires and is spun into the strand where it remains to lubricate the wires and protect them for the entire life of the rope.

The grease is skin-colored, very little of it gets on the outside of the rope, and, as a result, the lubrication feature is not objectionable to those who must handle and install it on airplanes.

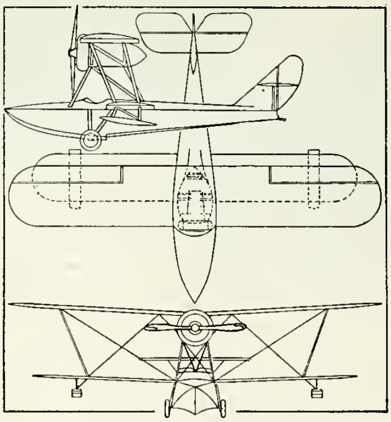
SAVOIA-MARCHETTI BABY AMPHIBION

OF the Savoia-Marchetti line of flying boats and amphibions soon to be manutured in this country by the American Aeronautical Corporation, the Baby Amphibion Model S.56 is one of the most interesting. It is interesting at this time because of the fast-growing participation in sport flying by many yachtsmen. The side by side dual control arrangement makes the Baby Amphibion desirable for training purposes.

The S.56 is a tractor biplane requiring a 75-100 horsepower motor. The American Aeronautical Corporation plans to install Kinner engines. The demonstration ships flying here at present are using the Walter.

Wings are of wood and metal construction, fabric covered. A high left wing curve is employed.

The hull is of riveted 2-ply double diagonal planked mahogany impregnated with a water proofed substance that eliminates soaking of water and the consequent taking on of additional weight. Impregnated cotton between the planks renders the hull watertight and seaworthy. Above the waterline the hull is of veneer, covered with fabric. Watertight compartments divide the hull, providing a factor of safety in the event of hull puncture.



Outlines of the Savoia S-56 amphibion.

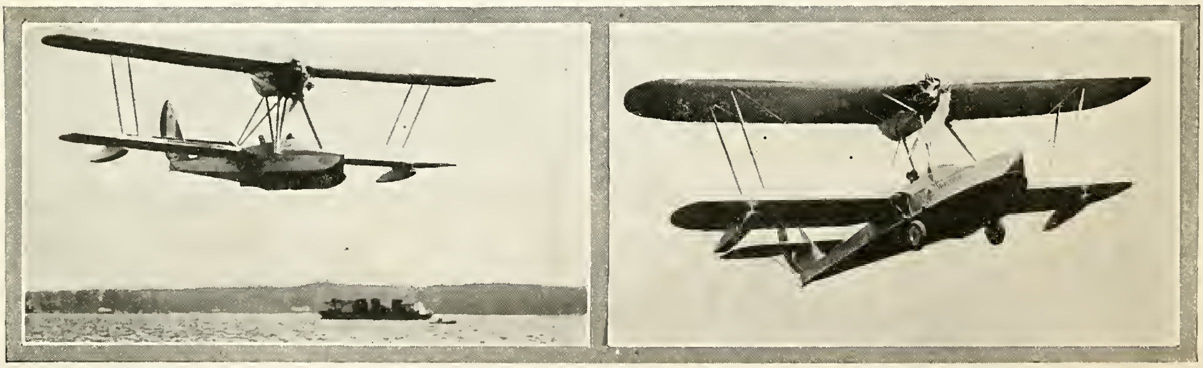
Two sets of controls placed side by side in the double pilots seat allow plenty of room and ease and communication for instructor and student. The secondary set of controls can easily and quickly be disconnected for emergency reasons or taken out completely to allow greater space for a passenger riding alongside the pilot. A full set of instruments is installed as standard equipment.

Back of the pilots' seats is an additional seat for a passenger or mechanic.

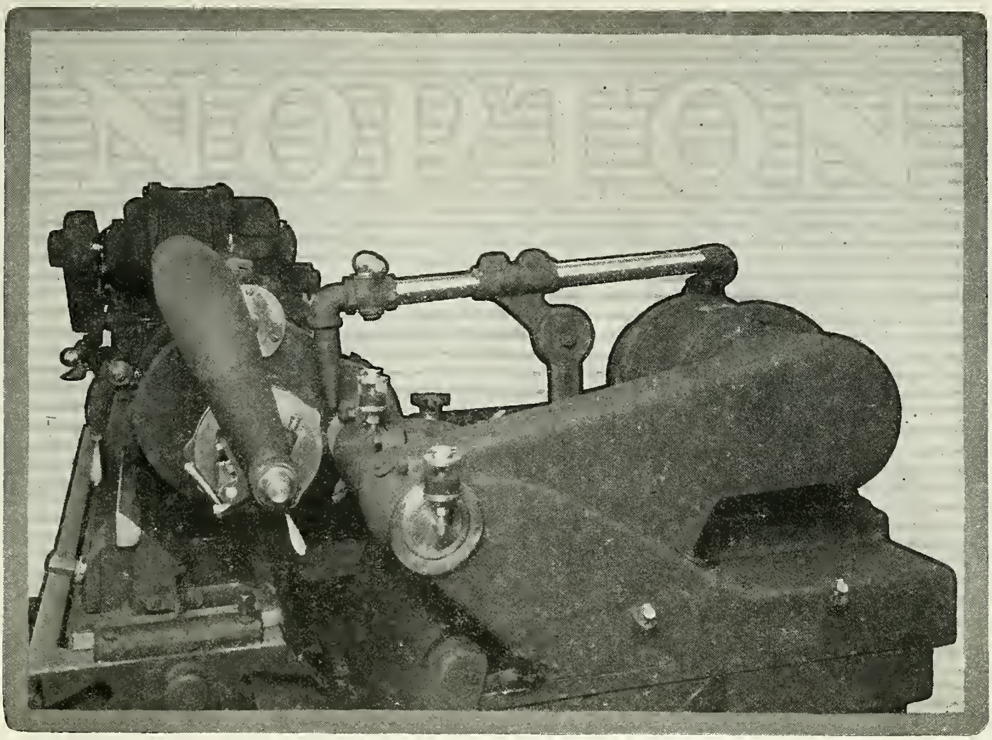
For raising or lowering the wheels, there is a lever situated between the pilots' seats which can be operated by either pilot. The operation is a simple one—the lever is pushed down to lower wheels and pulled up to raise them. When wheels are in the down position they are automatically locked by a toggle arrangement.

Specifications

Length overall	25 feet 8 inches
Height overall	9 feet 10 inches
Wing span	34 feet 1 inch
Wing area	279.5 square feet
Gross weight loaded	1,650 pounds
Useful load	550 pounds
Maximum speed (full load)	92 miles per hour
Cruising speed (full load)	80 miles per hour
Landing speed (full load)	38 miles per hour
Climb to 6,560 feet	25 minutes
Cruising radius	3 hours



The Savoia-Marchetti S-56 over water, with wheels retracted, and over land, with wheels in landing position.



Meeting the Grinding Requirements of the Airplane Industry

THE increasing popularity of aviation has brought the production of motors to a high level. And the quantity manufacture of the radial type of motor has brought its special problems.

One is the grinding of the cams. They are entirely different from those in the conventional automobile and tractor motor and present an entirely different grinding problem.

As Norton pioneered in the design and production of grinding machines to meet the special requirements of the automotive industry so it is also serving the aircraft industry. It has developed a machine to grind the cams of radial motors.

NORTON COMPANY WORCESTER, MASS.

NORTON

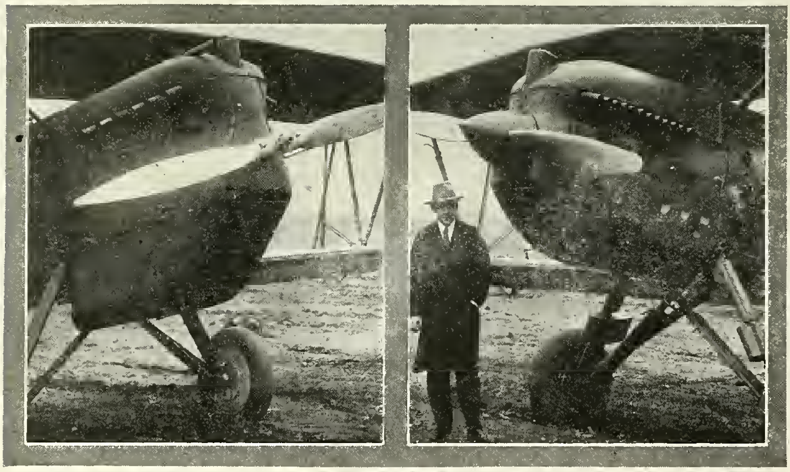
Grinding Wheels
Grinding Machines

Refractories-Floor
and Stair Tiles

NEW COOLING PROCESS for WATER-COOLED ENGINES

THE real significance of the new cooling system recently developed by the Army Air Corps can be appreciated when one considers that the method will tend to increase the efficiency of operation of all aircraft equipped with water-cooled engines in such respects as reduction of weight of the engine, increase in speed of plane made possible by the utilization of smaller radiators offering less head resistance, and reduced fuel consumption. The upright or inverted "V" or "in-line" types of engines are particularly adapted for use of this system of cooling.

It is not at all unlikely that many multi-engined airplanes of the future will increase their speeds ten per cent and their pay loads by several hundred pounds through the employment of the new cooling, combined with wing radiators of minimum resistance. Aircraft of the pursuit or speed type may find this a great boon as well. The greater the speed, the greater will be the increase due to such reduction of resistance of speed.



Comparisons showing Curtiss Falcons with regular radiator and new small type.

Although the new type cooling system is still in the experimental stage, service tests on the dynamometer and torque stand, as well as actual flight tests, indicate that the Air Corps is fully justified in continuing research and development work along this line.

The liquid used is known as Ethylene Glycol. When substituted for water in the jackets and radiators of an engine it can be operated at outlet temperatures of 300 degrees instead of 180 degrees Fahrenheit, permitting the use of a radiator of only about one-fourth of the size now required. Ethylene Glycol is the first and simplest member of the class of polyhydric alcohols. It is a clear, colorless, odorless fluid, boiling at 387 degrees Fahrenheit and has a slightly sweetish taste. Its chemical formula is CH_2OH. In structure and characteristics it resembles somewhat both ethyl alcohol and glycorol and occupies an intermediate position between the two. Due to its extensive use as an anti-freeze by the automotive industry, it has now become commercially available at relatively reasonable prices. It is not a newly discovered liquid, but its use in connection with high temperature cooling is a new development. During the past winter this product was sold under a trade-name at many garages and service stations as an anti-freeze.

Certain changes are found necessary when Ethylene Glycol is used as a cooling medium in engines already constructed. In general, joints and packing glands must be tighter and a closed cooling system used. The expansion of Ethylene Glycol when it becomes hot is somewhat greater than that of water, necessitating the allowance for a larger expansion space. The fuel supply should generally be treated with an extra amount of benzol, tetra-ethylene load or other anti-knock preparation to offset any added tendencies toward detonation.

For many years the majority of internal combustion engines have used water in circulation as a medium of carrying away the excess heat produced. From the first flight of Orville Wright in 1903, the radiator has been a perplexing problem to aircraft designers. Not only has its weight reduced the useful load of the airplane, but its resistance to flight was paid for in miles per hour.

In the ordinary system, 180 degrees Fahrenheit is the generally accepted maximum temperature considered for reliable operation, because the cooling water will boil away at 212 degrees. This gives a temperature difference of 120 degrees when operating in the air of 60 degrees Fahrenheit. By using Ethylene Glycol, the outlet temperature of which may be 300 degrees due to its high boiling point, the temperature difference becomes 240 degrees instead of 120 degrees. It is this difference which permits of a much smaller radiator to accomplish the same degree of cooling. The increase of engine operating temperatures within certain limits will in all probability make for certain fuel economies which in turn may appreciably increase the flying radius and pay load.

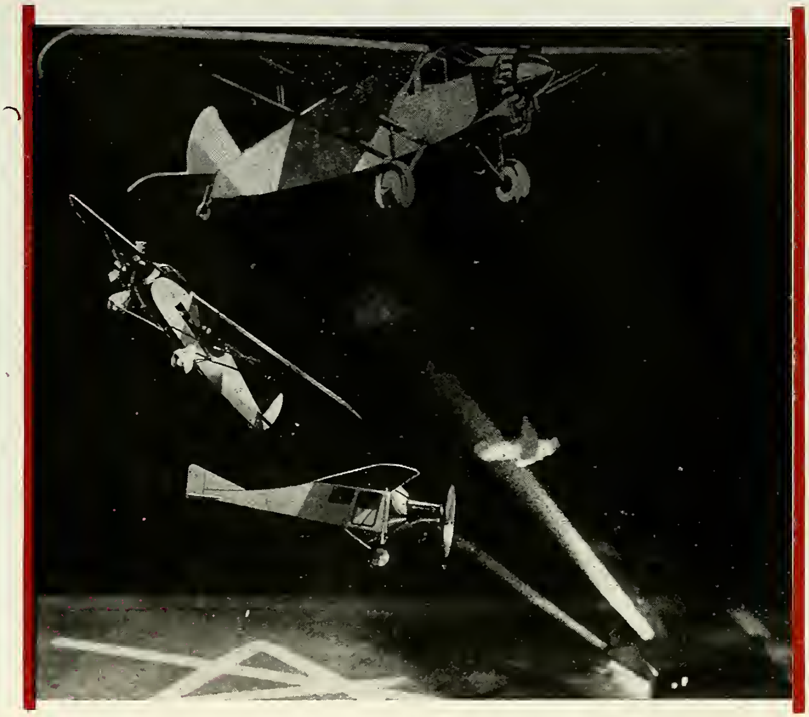
By reducing the resistance to the air and decreasing the weight, an airplane will carry a greater load at a greater speed. The liquid Ethylene Glycol accomplishes both desired results. For the military machine it means greatly increased performance and for the commercial type a greater pay load. The ordinary radiator used in a modern pursuit plane, for example, weighs 66.5 pounds, and its cooling water 112.5 pounds, total 179 pounds. The radiator often represents as much as 20 per cent of the total resistance of the airplane. By replacing it with one of 25 per cent capacity and filled with Ethylene Glycol, the results attained are surprising. The radiator resistance is cut to a fraction of its former value, 100 pounds are saved in weight and the speed of the airplane is increased by 11 miles per hour. By using small wing skin radiators in place of the new one-fourth size radiator, the speed is increased 15 miles per hour above that of the standard pursuit plane with the present conventional radiator. Such a reduction of necessary cooling area may make practicable the use of wing skin radiators used formerly on racing airplanes only.

Quite a number of flights have been made by Air Corps pilots, using the new process at temperatures up to 300 degrees Fahrenheit (outlet). During recent tests in which a Curtiss Pl-B type airplane, mounting a 420 horsepower Curtiss D-12 "V22" engine was used, the radiator was somewhat larger than the computations indicated as necessary, being about one-third the size of the radiator generally used as standard on this machine. Several test flights were made during which the maximum temperature of the cooling liquid was recorded as 270 degrees Fahrenheit. This occurred after ten minutes of full throttle operation at 2,000 feet. The airplane, relieved of approximately 90 pounds' weight of radiator and cooling liquid, appeared to possess better flying qualities than previously. The operation was considered satisfactory and indications were that the oil temperature under these conditions will run somewhat higher, a problem which can easily be solved by the use of a different oil or an oil cooler.

A few weeks after the announcement by the Army Air Corps that its engineers had proved Ethylene Glycol, known by the trade name of Prestone, to be a cooling fluid superior to water, the Curtiss Aeroplane and Motor Company took the lead among airplane manufacturers in using the new fluid by installing, for the first time on any commercial plane, a Prestone cooling system on a Curtiss Mail Falcon, powered with a Curtiss Conqueror 625 horsepower engine.

The most striking result of the installation was the reduction of the radiator to approximately one-quarter of its former size, due to the fact that only 4½ gallons of Prestone are required to cool the engine, whereas eighteen gallons of water had been necessary. In consequence, the frontal area was greatly diminished and the general aerodynamic efficiency of the ship much improved. The saving in weight amounted to approximately 125 pounds.

Time Flies with Naturaline



Commerce is no longer earthbound and Big Business has taken to the skies—because it saves time. Time is the most important thing in life.

Contributing materially to the increasing popularity and success of commercial flying is Naturaline.

Naturaline helps to save time.

IT STARTS INSTANTLY (because of its high volatility without vapor-lock).

IT INCREASES THE SPEED (because it increases the r. p. m., 50 to 125 depending upon the type of motor).

IT LENGTHENS THE FLIGHT (because it means a fuel saving of from 5-15%).

IT TAKES MORE ABOARD (because it is 46 lbs. per 100 gals. lighter).

IT GIVES BETTER MOTOR PERFORMANCE (because it burns completely giving more power and uniform fuel distribution to all of the cylinders).

IT KEEPS THE SHIP IN THE AIR (because its freedom from corrosion impurities reduces the motor overhaul to the minimum).

Naturaline carries Uncle Sam's Mail from New York to Miami—from New York to Mexico. Among the many well known transport companies to endorse Naturaline is Pitcairn Aviation, Inc. and St. Tammany and Gulf, also many of the leading pilots and successful airport operators of the country attest its wonderful advantages.

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NATURALINE

KINNER-ENGINED AMERICAN EAGLE

THE Kinner-powered American Eagle biplane, manufactured by the American Eagle Aircraft Corp. of Kansas City, is a three-place open cockpit commercial plane, suitable for flight instruction, aerial taxi work or sport flying. According to the producer, this ship is unusually easy to fly and will right itself from a stall, spin or other abnormal attitude. This model is manufactured under Department of Commerce Approved Type Certificate No. 124.

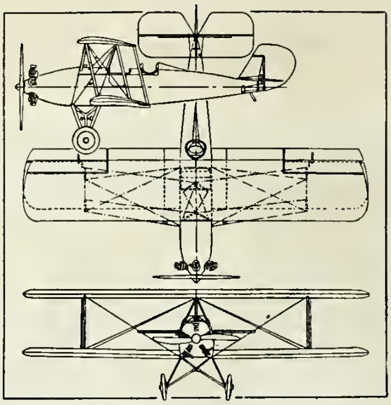
The forward cockpit comfortably accommodates two persons. Dual controls are provided.

Fuselage is constructed throughout of welded steel tubing, as also are the tail group members. The undercarriage of the split axle type is of sturdy construction. This type landing gear has been proved satisfactory in general usage, since its construction reduces the danger of nosing over in landings in high weeds or on rough ground. It also is sufficiently sturdy to withstand the shocks of student landings.

Wings are built of high quality airplane spruce, and fabric is employed as a covering for the entire plane. The wings are wired for flying lights. Interior finishing has been given careful attention, both as to detail and workmanship. Instruments include altimeter, tachometer, and oil and temperature gauges.

The Kinner engine, manufactured by the Kinner Airplane & Engine Corporation, Glendale, California, is manufactured under Approved Type Certificate No. 3. It is a five-cylinder radial air-cooled engine developing 100 horsepower at 1,850 revolutions per minute.

The plane is offered in two color schemes; namely, blue fuselage and yellow wings, and red fuselage and gray wings.



Outlines of the Kinner American Eagle

Dimensions

Length overall	25 feet 1 inch
Wing spread (tip to tip)	30 feet
Height	8 feet 4 inches
Chord	5 feet 3 inches
Stagger	12 inches
Gap	5 feet
Angle of incidence (upper and lower)	2 degrees
Upper wing area (including ailerons),	160 sq. ft.
Lower wing area (including ailerons),	140 sq. ft.
Total wing area	300 sq. ft.
Gasoline capacity	42 gallons
Oil capacity	5 gallons
Weight empty	1219.5 pounds
Useful load	725 pounds
Gross weight loaded	2041 pounds

Performance

Take-off	100 to 150 feet
Landing speed	30 miles per hour
Climb (first minute)	900 feet
High speed	105 miles per hour
Cruising speed	95 miles per hour
Service ceiling	14,000 feet
Cruising duration	5½ hours

AMERICAN EAGLE MODEL A-229

The Model A-229 is a two-place biplane designed for training purposes. This plane is powered with a 90 horsepower OX-5 engine.

In each cockpit, there is an adjustable seat, metal footplates underneath the rudder bar and a complete instrument panel. The interior is upholstered in Fabrikoid, and the floor is of waterproof mahogany plywood. Good vision is afforded from both cockpits.

The fuselage is narrower than that of the three-place ship. Both fuselage and tail surfaces are of welded seamless steel tubing. The wing spars are of Sitka airplane spruce. Ribs, built in jigs, are of selected spruce and waterproof mahogany plywood.

Controls are of steel tubing, enclosed. The upper wings are wired for navigation lights. Located in the fuselage is a thirty-five-gallon gasoline tank from which fuel feeds by gravity to the engine.

Model A-229 Specifications

Length overall	24 feet
Wing spread	30 feet
Height	8 feet 3 inches
Chord	5 feet 3 inches
Stagger	18 inches
Gap	4 feet 11 inches
Angle of incidence (both wings)	2½ degrees
Area, lower wing	140 square feet
Area, upper wing	160 square feet
Total wing area	300 square feet

Weights and Capacities

Weight empty	1,277 pounds
Useful load	850 pounds
Maximum gross weight	2,041 pounds
Gasoline capacity	35 gallons
Take-off	150 to 250 feet

Performances

Landing speed	30 miles per hour
Climb first minute	800 feet
High speed	100 miles per hour
Cruising speed	85 miles per hour
Ceiling	18,000 feet
Cruising radius	5 hours

American Eagle biplane powered with the 100 h.p. Kinner engine

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PERMITE PISTON

ALUMINUM INDUSTRIES, INC., of Cincinnati, Ohio, has developed a new piston, the Permite Unitype, which incorporates new features in piston design. It is said by its manufacturers to afford uniform heat radiation, which offers a means of equalizing growth of the piston under heat, and which compensates for the dimensional alteration in size.

In the new product each piston pin boss is divided by a cast-in slot. Outer bosses are connected directly with the piston head, while inner bosses are a part of the transverse aluminum struts which connect the thrust faces of the piston skirt, the transverse aluminum struts and thrust faces functioning independently of outer piston pin bosses. Diversion of heat flow and elimination of wall pressure and friction permit reduction of initial and operating clearance, since thrust faces do not present a four-point bearing, but show contact with the cylinder wall over the entire area. This insures accurate guidance of the piston rings, increasing general engine efficiency, and promoting oil and fuel economy.

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THE GENET 80-h.p. ENGINE

THE Fairchild Airplane Mfg. Co., Farmingdale, L. I., N. Y., has acquired from Armstrong-Siddeley, Ltd., England, exclusive rights to manufacture and sell the Genet engine in the United States. The production schedule will probably reach one hundred engines a month by July 1st. The Genet will be produced primarily to power the Fairchild 21, a two-place open cockpit low-wing monoplane.

The Genet is a conventional 5-cylinder radial air-cooled engine rated at 80 horsepower at 2,200 revolutions per minute.

It has a compression ratio of 5.2 to 1, and a displacement of 251 cubic inches. Guaranteed specific fuel consumption is .55 pounds per horsepower hour, and guaranteed oil consumption is .025 pounds per horsepower hour. The engine has a 4-inch bore and stroke and weighs 215 pounds.

Cylinder assembly consists of a steel finned barrel with shrunk and screwed-on cast-aluminum head. The seal between the head and barrel is assured by a patented beveled lock nut which transforms the expansion of the aluminum head when heated into increased pressure against the steel barrel. making the original shrink fit even tighter. The cylinder assembly is secured to the crankcase by a steel screwed sleeve which permits accurate adjustment of the compression ratio of the engine.

Crankcase is made in three parts which are simple heat-treated aluminum alloy castings. The body of the crankcase carries the cylinder and valve tappet assemblies. The nose casting carries two flange mounted magnetos and a double-geared oil pump, all of which are driven through beveled gears from the crankshaft. The rear casting forms the induction blower casing and supports the carburetor and engine starter. The mixture from the carburetor passes through an oil jacketed intake heater into the shaft speed rotary fan, the function of which is to insure distribution of the mixture to all cylinders at all speeds.

The valve gear is of open push rod type, operating from a double cam ring at the front of the cylinders. Rocker arms are of ball bearing construction. Valves are of Cobalt chrome steel seating on special stainless steel seats which permit the use of Ethyl fuel if desired. Valve springs are double, made of bright finish music wire.

The engine employs a one-piece crankshaft made from a chrome nickel drop forging, highly finished all over to insure thorough inspection for minute material defects. The shaft is counter-balanced with bronze counterweights, and is both statically and dynamically balanced in manufacture.

Master rod is of two-piece construction and employs a steel back babbitt-lined crank pin bushing. Link rods and master rod are of H section, and are manufactured from drop forgings, heat-treated and pickled in process, and highly finished all over for the detection of material defects. Wrist pin and link rod bushings are of the floating type, insuring thorough lubrication and freedom from possible seizing.

Pistons are manufactured from forged Y-alloy, finished all over and balanced. Each piston employs two plain compression rings and two oil scraper rings, one above and one below the piston pin. Ignition is arranged with two spark plugs in each cylinder operating independently from two flange-mounted magnetos. One of these magnetos is fitted with an impulse coupling to facilitate starting the motor.

The oil pump is of double-geared type, consisting of a scavenging pump of large capacity which draws the oil from the bottom of the crankcase through a strainer and delivers it to the intake heater, from whence it passes to the oil tank. The pressure pump receives the oil from the tank and passes it through a second filter. From here the oil passes into the hollow crankshaft, through which it is distributed to all the bearings and cylinder walls. The crankshaft is supported by two Hoffman roller bearings with an auxiliary ball bearing at the front end af the case which takes the propeller thrust.

PORTABLE AIR SPEED INDICATOR TESTER

A NEW portable air speed indicator tester, the first of its kind ever developed, has been introduced by the Consolidated Instrument Company of America, Inc. According to officials of the company, this new tester device is the only means yet introduced for checking air speed indicators after their installation in a plane.

The device is encased in a small wooden box. The mechanism consists simply of the dial which registers the air speed indication, and a long rubber tubing the end of which is attached to the instrument to be tested. The tubing itself is passed through a pair of rollers on the inside of the box, which acts to supply the air pressure.

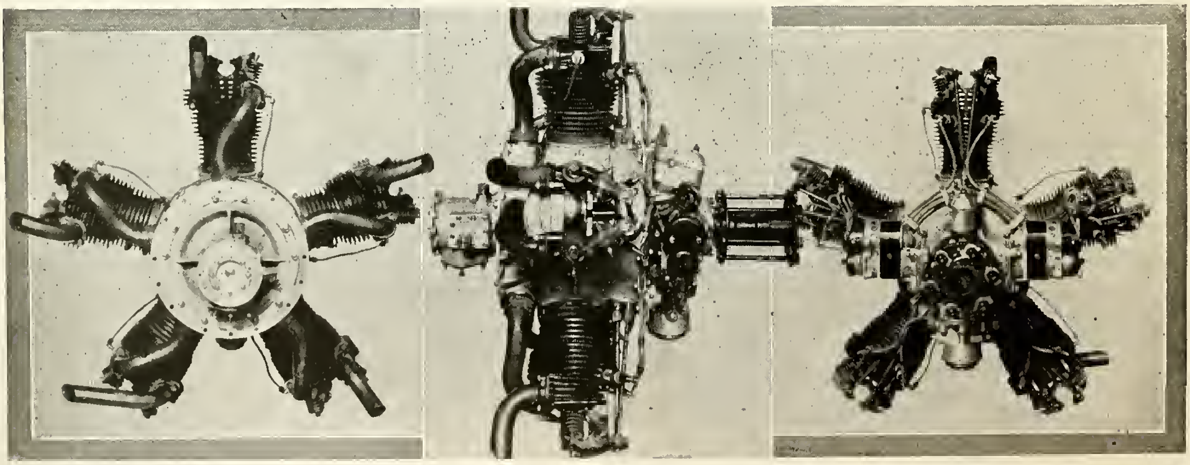
ACCURATE R.P.M. READING DURING DUAL FLYING

SYNCHRONIZED tachometers in front and rear cockpit have now been made available by the production of two types of dual adapters and the model F series, Reliance tachometers by Barbour Stockwell Co., Cambridge, Mass.

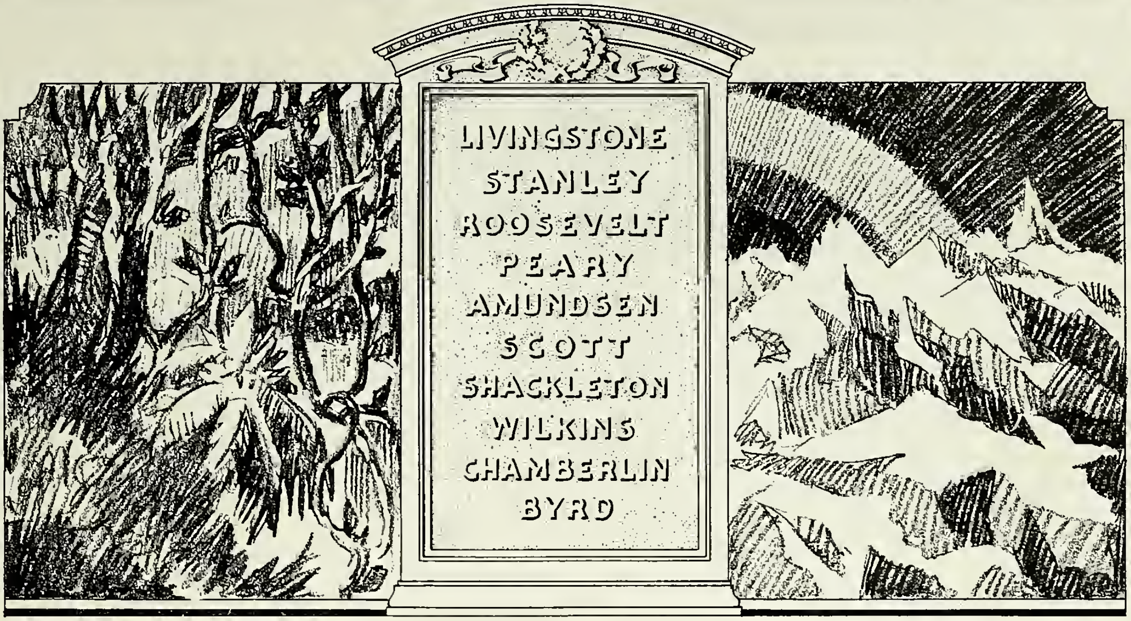
If a plane is already equipped with one tachometer in the front cockpit, one of the eleven different model F Reliance tachometers, with back flange, can be mounted temporarily or permanently on the surface of the dash in the rear cockpit. A Reliance dual adapter (U or T type) can be installed on the engine at the regular tachometer's outlet and the two operated synchronously therefrom.

This not only provides a double check on the performance of the engine and the accuracy of r.p.m. indication, but also obviates the necessity of conjecture on the part of the instructor, enabling him to advise his student accurately and intelligently on proper engine speeds under different conditions.

The Barbour Stockwell Co. produces adapters or drives with the particular engine fittings and ratios to meet the manufacturer's individual requirements.



The Armstrong-Siddeley Genet engine to be manufactured in the United States by the Fairchild Co.



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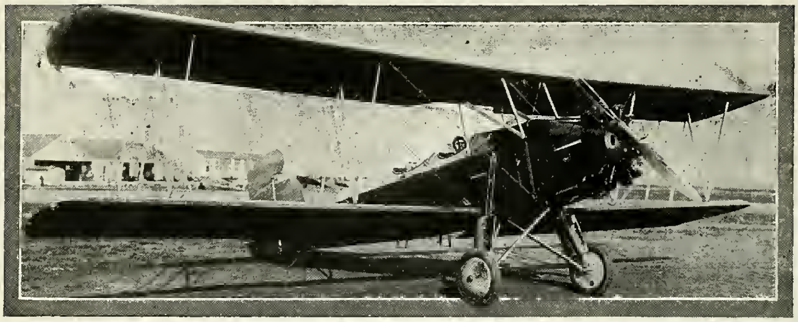


CURTISS FLEDGLING

QUANTITY production of the Curtiss Fledgling training plane for use by commercial flying schools has been commenced by the Curtiss Aeroplane and Motor Company at its Buffalo factory. It is expected that early in May production will have reached eighteen a month. The Fledgling is a two-place two-bay biplane of sturdy construction, and is convertible as either a land or seaplane.

The commercial Fledgling is similar to the military type, which is used by the Navy as a training plane. It is equipped, however, with the Curtiss Challenger 170 horsepower, air-cooled radial engine rather than the Wright Whirlwind.

The Fledgling takes off quickly after a short run, climbs rapidly, has control even at slow speeds, and, according to the manufacturer, will not go into a spin unless forced into it. It is capable of executing all maneuvers not requiring excessive power including rolls, loops, spins and true Immelmans. At full throttle it develops a speed of 106 miles per hour. It cruises at 85 miles per hour, lands at 36 miles per hour and climbs at an initial rate of 670 feet per minute toward its absolute ceiling of 16,600 feet.

Structurally the Fledgling follows conventional lines with steel fuselage, wood wings, and fabric covering. Tail surfaces and ailerons are constructed of steel tubing. Frise ailerons are used on both upper and lower panels and are differentially controlled. The horizontal stabilizer may be adjusted in flight from both cockpits, and the vertical stabilizer is adjustable on the ground. Both elevator and rudder are balanced.

Landing gear is of the axleless type, and is provided with combination oleo and rubber disc shock absorbers allowing a ten-inch movement. The steerable tail-skid is equipped with rubber disc shock absorbers and a removable shoe.

Controls are stick and pedal, the rudder and elevators being actuated by cables and the ailerons by independently operated push and pull rods. The stick in the rear cockpit is removable. On the instrument boards, Pioneer equipment is used throughout. Seats are adjustable and designed for seat-type parachutes. Life preservers are provided in each cockpit, and aft of the rear cockpit, there is a roomy stowage compartment. Good vision in the Fledgling is obtained through excessive stagger and a cutout in the center section of the upper wing.

Parts requiring inspection are easily accessible, and all moving parts are provided with grease or oil fittings. Structural steel members are hermetically sealed against corrosion.

As previously mentioned, the power plant is the Curtiss Challenger, a six-cylinder staggered radial developing 170 horsepower at 1,800 revolutions per minute and is equipped with priming system and an Eclipse hand inertia starter. This engine was described in detail in the September, 1928, issue of AERO DIGEST. A 40-gallon gas tank and a 5-gallon oil tank are located aft of the firewall. Forced feed is employed in both fuel and lubricating systems.

With the exception of the power plant, the Navy Fledgling is the same as the plane just described, save for a few minor changes necessary to adapt it to the requirements of military training, including fixed gunnery, flexible gunnery, radio spotting, and bombing. A fixed Browning machine gun is mounted in the fuselage, firing through the propeller and operated by triggers on the control stick. In the rear cockpit provision is made for the installation of a flexible gun ring for the Lewis guns and regulation fire steps for the gunner to stand on. For bombing training, provision has been made in the rear cockpit for the installation of a bomb sight and for the removal of part of the flooring for sighting. Standard bomb racks can be fitted to the lower wings. The rear seat and control stick can be readily removed from the plane when it is not being used for dual instruction. Provision is made aft of the rear cockpit for the installation of radio set, and there is a small auxiliary folding seat for the observer's use when radio spotting.

Specifications

Length	27 feet 10 inches
Height	10 feet 4 inches
Span	39 feet 1 inch
Wing area (including ailerons),	364.9 square feet
Wing loading	7.37 pounds square foot
Power loading	15.82 pounds per horsepower
Aerofoil section	C-72
Load factor	7.5

Weights

Weight empty	1,996 pounds
Useful load	694 pounds
Gross weight	2,690 pounds

Performances

High speed	107 miles per hour
Cruising speed	85.6 miles per hour
Rate of climb	670 feet per minute
Cruising range	421 miles
Service ceiling	14,100 feet
Absolute ceiling	16,600 feet
Landing speed	36 miles per hour

RECENT AERONAUTICAL PATENTS

THE following patents of interest to readers of AERO DIGEST were issued recently from the United States Patent Office. Copies thereof may be obtained from R. E. Burnham, patent and trademark attorney, Continental Trust Building, Washington, D. C., at the rate of 20c each. State number of patent and name of inventor when ordering.

Airship. Benjamin Schnitzer, Akron, Ohio, assignor to Goodyear-Zeppelin Corporation, same place. (1,701,466)

Tunnel airboat. Karl M. E. Zwinkel, Denville, N. J. (1,703,916)

Aircraft provided with rotating wing surfaces. Lucien Chauviere, Paris, France. (1,704,034)

Amphibian aeroplane with boat-shaped pontoons. Edward R. Carroll, Burmingame, Cal. (1,704,076)

Aircraft. William Stelzer, Chicago, Ill. (1,704,112)

Flying-machine. Julius von Waldy, New York, N. Y. (1,704,449)

Aircraft flotation device. Frederick H. Johnson, Kenmore, N. Y. (1,704,612)

Metal spar for use on aircraft. Hamilton N. Wylie, Coventry, England, assignor to Sir W. G. Armstrong Whitworth Aircraft Limited. (No. 1,708,994.)

Landing method for aircraft. Frederick Brunner, Camden, N. J. (No. 1,709,058).

Launching and landing station. Julius S. Fox, Cleveland, Ohio. (No. 1,709,069).

Aircraft. Frank J. Jaeger, Toledo, Ohio. (No. 1,709,220).

Apparatus for lowering mail-bags and other loads from aircraft. Harold E. S. Holt, London, England. (No. 1,709,264).

Beacon system for night flying. Elmer A. Sperry, Brooklyn, N. Y., assignor to Sperry Development Co., Dover, Del. (No. 1,709,377).

Aeroplane. William Jordan and Charles S. Nichols, Lancaster, Neb. (No. 1,709,402).

Aero smoke bomb. Walter L. Shively, Washington, D. C. (No. 1,709,597).

Signalling and projecting images on aerial craft. Hugo Junkers, Dessau, Germany. (No. 1,709,620).

Method and means for navigating aircraft. Hugo Junkers, Dessau, Germany. (No. 1,709,621).

Light for aircraft. Samuel Wiley, Jr., Metuchen, N. J. (No. 1,709,644).

Apparatus for proving heat, light, and radio service for airships. Paul Possin, Philadelphia, Pa. (No. 1,709,684).

(*Continued on page* 124)

EMPTY CHAIRS

IT is a costly matter to carry empty chairs on the scheduled trips of a transport plane. But there will be empty chairs so long as transport rates are unreasonably high—and there will be high rates so long as there are high operating costs.

The short life and the unusually high expense of maintaining equipment have, in the past, contributed heavily to the cost of operating air lines, and have materially decreased their earning power. Now, however, it is possible by means of the Allmetal Flamingo to introduce low air-rates and to increase earnings appreciably.

The flying costs of the Allmetal Flamingo are the lowest per passenger mile of any transport plane in its class in America today, because:

The long life of the metal used in its construction has been thoroughly demonstrated. Depreciation of the plane is a negligible item.

Maintenance, also, is reduced to a minimum because there is no need for annual plane overhauls; no re-covering nor doping necessary; no warped wings or control surfaces to re-align; no rigging to true up.

The engines used are of proven ability. They will economically carry heavy loads at high speeds.

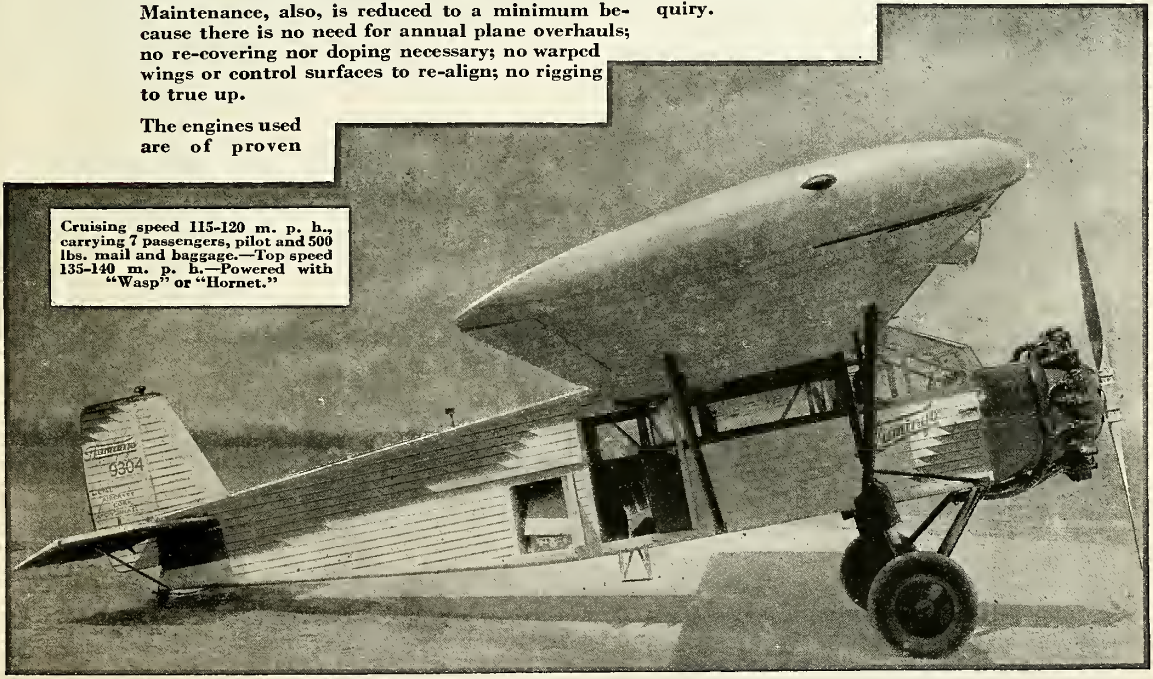
The carrying capacity of 7 passengers, pilot and 500 lbs. of mail and baggage is definitely proved by European air travel figures to be the most economical capacity for day-in day-out traffic demands—even where rates are comparable with rail rates.

The initial cost of the Allmetal Flamingo is practically the same as that of wood and fabric planes of equal capacity.

To these unique characteristics of the Flamingo are added special considerations for the safety and comfort of passengers—unusual flying ease for the pilot—features that are realized in a manner not found in other transport planes.

The best insurance against empty chairs—and the best assurance of increased earnings, are to be found in the Flamingo.

We invite your inquiry.



Cruising speed 115-120 m. p. h., carrying 7 passengers, pilot and 500 lbs. mail and baggage.—Top speed 135-140 m. p. h.—Powered with "Wasp" or "Hornet."

ALLMETAL FLAMINGO

The METAL AIRCRAFT CORP.
CINCINNATI

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★ACHIEVEMENT (Noun) A noteworthy and successful action or a distinguished feat. (Heraldry) An escutcheon.

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In 1920 the EMSCO ASBESTOS COMPANY was organized. It is the only organization on the Pacific Coast which produces crude asbestos from its own mines and carries it through the various processes of manufacture.

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★ACHIEVEMENT (Noun) A noteworthy and successful action or a distinguished feat. (Heraldry) An escutcheon.

(*Continued from page* 120)

Aeroplane. Herman J. Morse, Raymond, Wash. (No. 1,710,028).

Aerodynamic balance. Albert F. Zahm, Washington, D. C. (No. 1,710,135).

Hollow body, especially for airships. Johannes Schwengler, Strelitz, Germany. (No. 1,710,195).

Aeroplane. Aubrey M. Kennedy, New York, N. Y. (No. 1,710,225).

Landing mechanism for aeroplanes. John E. Broyles, Entiat, Wash. (No. 1,710,290).

Floating airliner. Swan M. Lindstrand, Chicago, Ill. (No. 1,710,423).

Airplane. Randolph F. Hall, Ithaca, N. Y. (No. 1,710,476).

Safety attachment for airplanes. Angelo C. Harper, Washington, D. C. (No. 1,710,618).

Brake for aeroplanes. John H. Kessler, Nyack, N. Y. (No. 1,710,628).

Attachment (for holding an aviator's belt to an aircraft frame). Ralph E. Oversmith, Kenmore, N. Y., assignor to Consolidated Aircraft Corporation, Buffalo, N. Y. (No. 1,710,837).

Vacuum brake for airplanes. Leonard R. McLaughlan, Los Angeles, Cal. (No. 1,710,938).

Aeroplane-propellor. Walter K. Dwelle, Houston, Tex. (No. 1,711,047).

Ground-speed meter. Charles F. Jenkins, Washington, D. C. (No. 1,711,318).

Airship mooring mast and controls therefor. John J. Crain, Waterbury, Conn., assignor to Waterbury Tool Co., same place. (No. 1,712,104).

Parachute-pack. Herbert F. McClintock, San Diego, Cal., assignor to Russell Parachute Co., San Diego, Cal. (No. 1,712,307).

Parachute-pack. James M. Russell, San Diego, Cal., assignor to Russell Parachute Co., San Diego, Cal. (No. 1,712,309).

THE CAPRONI CA.79

By MAJOR CARLO de RYSKY

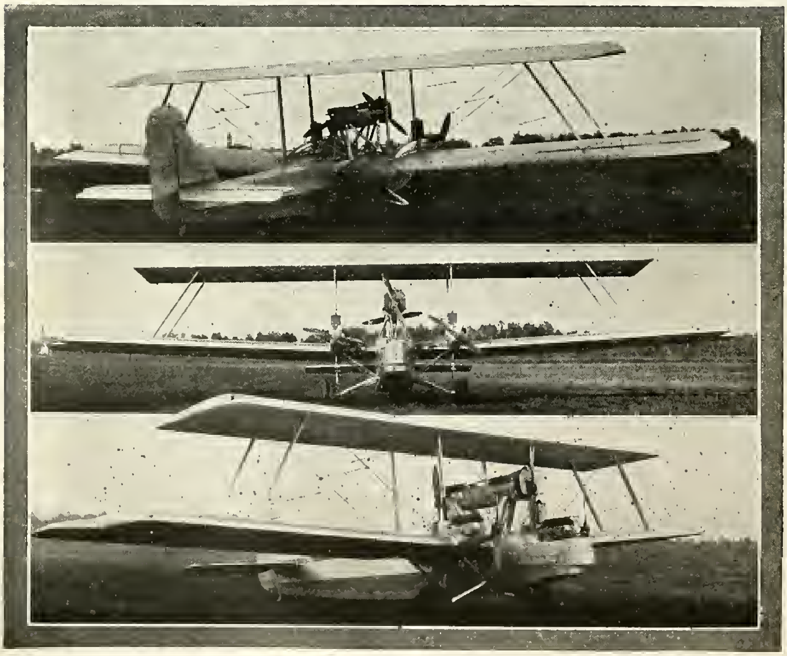
THE Caproni CA.79, which is built in Milan, Italy, and follows the well-known lines of all the big Caproni airplanes, is constructed entirely of high tension steel and duralumin, although the use of the latter has been very limited. The CA.79, as the plane is designated, is a four-engined biplane, the engines being Isotta-Fraschini Asso of 500 horsepower each. Two of them are in tandem above the fuselage and between the wings, and the other two are mounted one on each side above the landing struts. The cell is formed by the two main wings, the lower being of greater span than the upper. Both wings have the same chord and are of semi-rigid construction including the center wing section. Ailerons are on the lower wing only. Dihedral angle is in the lower wing. The all-metal fabric-covered wing has two spars built up of corrugated steel sheets joined by a duralumin skeleton. Strong steel sheet boxes riveted on the upper members constitute the joints of the struts to the spars. The ribs are of similar construction, built up on duralumin rolled girders with struts of steel tube and steel wire bracing.

The fuselage is constructed of steel tubing. It consists of four steel tube beams, joined together by steel tube struts and wire bracing, covered with fabric. The construction of the monoplane tail is similar to that of the wings. The trim of both fin and stabilizer can be varied in flight. Entrance to the ship is by means of two doors, one in the pilot's compartment, the other behind the lower wing. Internally the passage is free by means of a foot-path that rests upon the lower longitudinal members. The pilot's cockpit is very wide, spacious, and well arranged, the seats being sufficiently large to accommodate those wearing parachutes. The visibility is excellent, an essential quality for a machine of this size. Dual controls are of the usual Caproni type.

In the nose of the fuselage is the observer's seat with the machine gun mounting and bomb-release controls. The latter are electrically operated and are situated under the center portion of the lower wing. The bomb racks can carry four bombs of 1,100 to 1,750 pounds each outside the fuselage, or four bombs of 1,100 ponds each inside the fuselage, or eight of 550 pounds each, or 32 bombs of 220 pounds each. Behind and above the bomb-release is situated the second machine gun which has a very wide firing radius, being in a condition to fire vertically on both sides of the fuselage; the third machine gun is fixed underneath, firing downwards, and is completely retractable when not in use.

The CA.79 is strictly a war machine armed for defensive purposes, being able to fire in all directions. The heavy load of high explosives it carries enables it to be used for long range bombing to destroy the enemy's live connections and important and vital centers, so as to paralyze its movements.

This machine opens a new era in the history of Italian aircraft construction, for from the small and necessarily incomplete airplane to this latest machine which incorporates all the requisites long asked for in such aircraft, is considered an important achievement in Italy.



The 2000 h.p. four-engined Caproni can carry a load of 10,000 pounds.

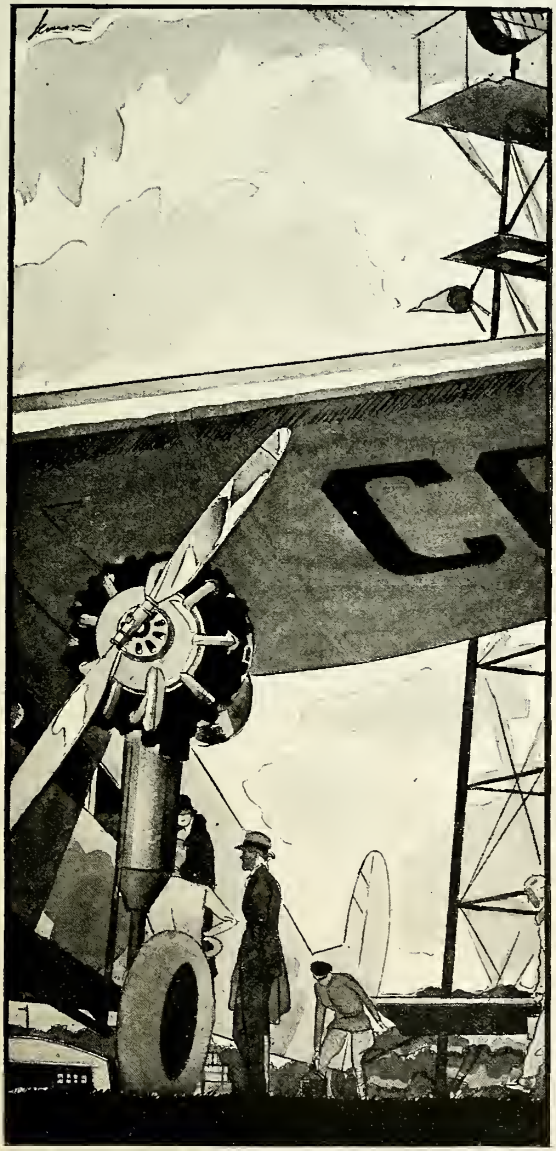
Specifications

Maximum span	108 feet
Length	53 feet
Gap	13 feet
Wing surface	2,368 square feet
Engines (4 Isotta-Fraschini "Asso")	500 horsepower each
Total horsepower	2,000 horsepower
Weight empty	14,326 pounds
Useful weight	9,918 pounds
Total weight	24,244 pounds
Maximum speed	130 miles per hour
Stalling speed	55 miles per hour
Service ceiling	18,000 feet
Range	930 miles

COTTER PIN TOOL

THE Billings and Spencer Company of Hartford, Conn., has started production on a new valve and cotter pin tool. The jaws hold the cotter pin for inserting; the flat bevelled extremity of the handle spreads the pin; the hooked extremity on the right pulls the pin out. The jaws are suitable also for valve work; they will slip in washers where ordinary pliers do not have reach enough. The tool is of forged steel.

TO THE GROWTH OF AIRPORTS



THE number of excellent flying fields in America is increasing so rapidly that even in listing them the Department of Commerce has difficulty. Something of the same sort is true of Wright engines. The average man thinks automatically of Wright when he thinks about aviation. The public knows that it was in a Wright-powered plane that Lindbergh made his memorable visit to Paris and it is with Wright engines that most of the famous trans-oceanic flights have been made.

Wright engines . . . and modern, conveniently located airports . . . have done as much as any other factors to build up confidence in flying.

Statistics show that approximately thirty-five per cent of all the airplanes in America are powered by Wright. This, of course, is most impressive proof of Wright efficiency and safety.

Ninety-four per cent of the parts for "Whirlwind" motors are interchangeable. And the twelve regional distributors listed in this advertisement carry as complete a stock of Wright parts as can be found at our factory. Under these distributors a large and growing number of Approved Service Stations function. They network the whole country, and as new airports are established, new Wright Service Stations come into existence.

The list of Wright distributors is printed here to make it easy for flyers, owning Wright-powered planes, to know where spare parts can be quickly obtained.

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WRIGHT
AERONAUTICAL CORPORATION
PATERSON, NEW JERSEY

MIAMI AMPHIBIAN

THE new five-place amphibian of the Miami Aircraft Corporation has successfully completed all preliminary test flights, and construction has been started on several more. At the time of this writing, only the initial tests as a seaplane have been completed. It is planned, however, to attach the retractable landing gear and make the tests as a landplane within the next few weeks.

An Approved Type Certificate has been applied for from the Department of Commerce. Only materials and standards known to be approved by the Department were used in its construction, and no delay is anticipated in receiving the certificate.

The Miami Aircraft Corporation was organized in February of this year with J. M. Smoot, nationally known turfman, as president; J. M. Nixon, vice president, and M. C. Landis, secretary-treasurer. F. J. Somers was employed as superintendent, and L. C. McCarthy, Jr., as engineer. A temporary factory was secured in Hialeah, Florida, and the test plane was successfully flown exactly five weeks after the factory was opened. Plans are being prepared for a factory to cost $250,000 to be built in Miami in which the company plans to produce not less than five amphibians of this type each week.

The Miami amphibian is an internally braced monoplane with a span of 44 feet and a mean chord of 87.5 inches. The wing tapers in width and thickness towards the tips. It is constructed of spruce and mahogany and is covered with fabric. The spars are of box sections with a plywood web. Mahogany ribs are reinforced and capped with spruce. Macwhyte tie rods are used for internal bracing.

The 33-foot hull is constructed entirely of wood, inasmuch as the designers believe that wood, with proper care, is more durable for this purpose than metal. The hull is divided into five watertight compartments. The longerons, keel, and step bulkhead are of ash. The bottom is double planked with mahogany, and mahogany plywood is used on the sides and deck.

The plane is available either as an open cockpit job or with a cabin. The cabin is detachable and may be removed in 30 minutes. The cockpit is 45½ inches wide. It is finished in pigskin and leather, which has the merit of being durable as well as attractive.

The engine mounted on top of the wing and aft of the cabin makes it exceptionally quiet for passengers and pilots. The occupants have unobstructed vision and enter and leave the ship from the forward end, which is well clear of the engine and propeller at all times.

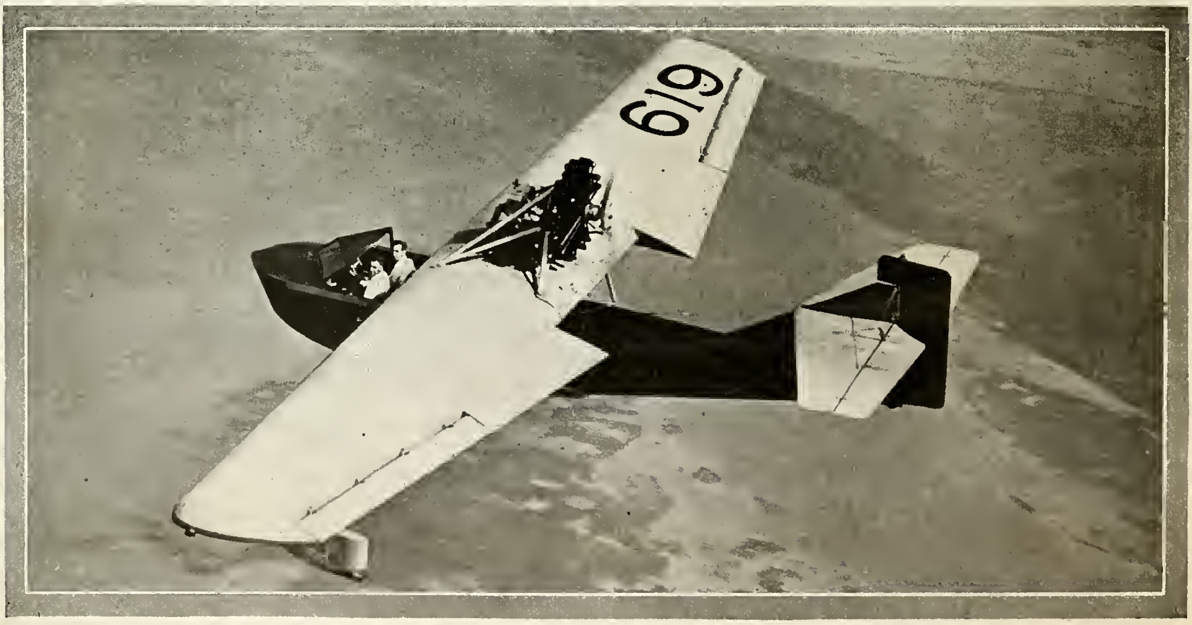
Dual control of the wheel type is provided. The pilots sit in the forward part of the cockpit and behind them is a very comfortable seat for three passengers. A "V" type windshield of unique design affords the pilots almost as much protection from the elements as if enclosed by the cabin..

The instrument board includes the usual instruments. Flying lights are installed upon the rudder and wing tips. In the cabin job a dome light is provided.

The plane is designed for radial air-cooled engines of from 170 to 300 horsepower. In the test plane, a B-2 Menasco-Salmson, developing 260 horsepower at 1,725 revolutions per minute, has been installed. The plane is expected to attain its peak performance with the new nine-cylinder Wright J-6, which develops 300 horsepower.

The plane is of very sturdy construction and in its initial tests it has demonstrated a high speed of approximately 120 miles per hour with the Menasco and some splendid flying qualities. The ease of control is remarkable and the response immediate. It has taken off in nine seconds, climbed 880 feet the first minute, and landed at 48 miles per hour with 60 per cent full load.

(*Continued on next page*)



View from another plane showing the Miami amphibian in flight over the waters of Florida

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that's the story of Vought planes in a nutshell. Speed—160 and better, in fact, these exceptional planes will both outclimb and outmaneuver lighter pursuit planes at 18,000 feet and over. The perfect balance, inherent stability, and rugged construction of Vought quality planes have been put to the most crucial tests time and again. Is it any wonder that Vought "CORSAIRS" are standard equipment in the United States Naval Air Service? These remarkable planes are convertible to land planes, seaplanes or amphibions — each one a superior all around performer.

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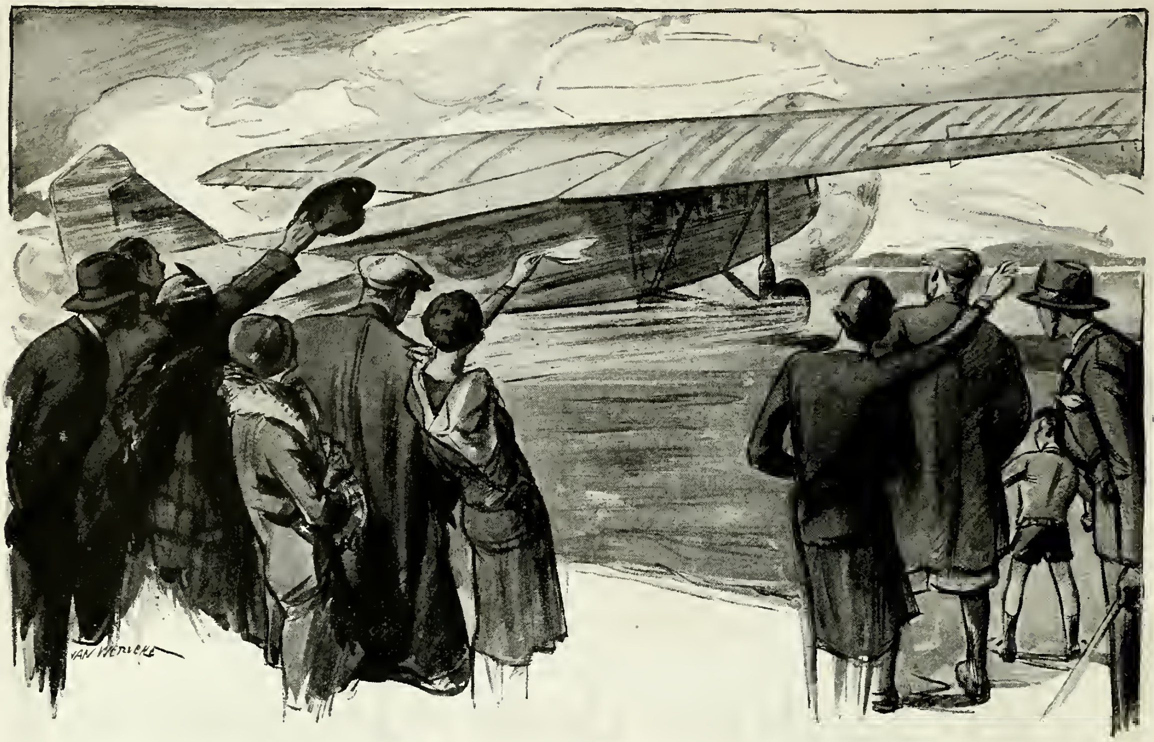

AIR-MINDED AMERICA

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-TP- Oils are new—the latest development in scientific lubrication. They have been tested and approved by leading manufacturers of airplane engines and by many leading pilots. They are straight-run oils, not blended or compounded, produced from pure, paraffine-base crude by a process for which patents are pending.

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-TP- Aero Rocker Arm Lubricant

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PATENT PENDING

Aero Digest 6-29

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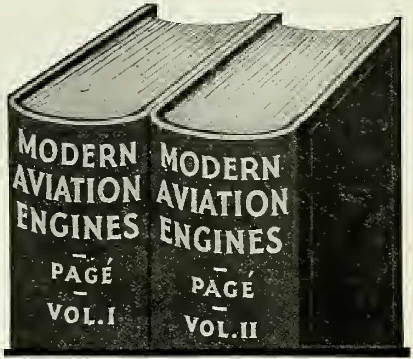

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EXPLAINS AND ILLUSTRATES EVERY TYPE OF AIRCRAFT MOTOR

These two wonderfully illustrated volumes contain forty-six chapters describing the leading aircraft engines of all nations. Special chapters give detailed descriptions of leading commercial engines such as the Wright "Whirlwind" and "Cyclone"; the Pratt and Whitney "Wasp" and "Hornet," Anzani, Cirrus Mark 11 and 111; Packard, Curtiss and Caminez air and water-cooled types and their accessories.

The servicing, overhauling and repairing of these engines and all others are given in minute, careful detail. ***These two great new volumes will bring anyone a better and more thorough understanding of all types of aviation motors.*** They will show you why certain designs and types are favored, why airplane engines work as they do, how they are designed, constructed, installed, serviced, repaired and operated in flight. All accessory systems such as lubrication, carburetion, cooling and ignition, are described at length and complete illustrated instructions for repairing magnetos and carburetors are included.

Prepared with Army and Navy Cooperation and Leading Airplane Engineers

MODERN AVIATION ENGINES, by Major Victor W. Pagé, was prepared with the cooperation of the Army and Navy authorities and leading commercial airplane and engine constructors. This 2-volume set will bring new and valuable information to the most advanced professional; it is being rapidly adapted for study by all leading aviation schools, and beginners are using it to save many hours of ground work later on.

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A. D. 6-29

(Continued from preceding page)

Specifications

Wing area including ailerons	322 sq. ft.
Aileron area	26 sq. ft.
Fin area	15.25 sq. ft.
Stabilizer area	35.8 sq. ft.
Elevator area	32 sq. ft.
Rudder area	14.75 sq. ft.
Weight empty	1,900 lbs.
Gasoline capacity	330 lbs.
Oil capacity	30 lbs.
Pay load	660 lbs.
Wing loading	9.5 lbs. per sq. ft.
Power loading	11.5 lbs. per h.p.
Maximum speed	120 miles per hour
Landing speed	52 miles per hour
Rate of climb	880 ft. per minute
Ceiling	18,000 ft.
Range (cruising speed)	500 miles

The performance figures listed are from calculations, though most of them have been verified by actual tests.

R. S. V. CONVERTIBLE PLANE

By Paul E. Lamarche, Jr.

THE Belgian firm of Stampe and Vertongen, which specializes in the construction of training planes and small transport planes at its plant at Deurne-Sud, near Antwerp, recently placed a new plane on the market for private ownership which has several interesting features. This ship is to be built in America by the Gates Aircraft Corporation. In general design this new plane follows the line of certain types of English planes designed for the same purpose. This new R. S. V. plane may be used either as a monoplane or a biplane; it is known as the R. S. V.-18 when equipped as a monoplane and the R. S. V.-26 when equipped as a biplane. Aside from the wings, the two are identical and may be converted from monoplane to biplane or vice versa in a very short time.

The plane is powered with the Renard 100 horsepower air-cooled motor, a Belgian motor which can develop 120 horsepower at 1,600 revolutions and which is to be produced in America by the Wright-Tuttle Aircraft Motors Corporation. The biplane is intended for owners who want a plane of small radius of action and average speed, but which at the same time is easy to handle and is able to take off from and land in small fields. The R. S. V.-26 is able to take off in 200 feet and land in 225 feet. Its most economical cruising speed is 83 miles an hour, and this speed can be maintained at 1,200 revolutions with the motor developing 55 horsepower. The fuel consumption is 4.7 gallons of gasoline an hour at cruising speed. The biplane, according to the manufacturer's claim, will not put itself into a spin in case of loss of flying speed.

The monoplane is said to be equally stable. The principal difference between the monoplane and the biplane is in the wing loading per square foot. The monoplane also is faster and has a greater range of action on the same amount of fuel. Although landing speed is greater, the ship is able to take off in 225 feet and land in less than 330 feet. Ordinarily the capacity of the fuel tank permits five hours of flight, during which the plane can cover a distance of about 480 miles. A second tank can be installed in the center section of the thick wing on the monoplane so that its radius can be increased to 990 miles.

The construction of R. S. V. planes is mixed—wood, steel and duraluminum being used. The plane is to be altered somewhat for production in America, the principal change being the substitution of a steel for the present wooden fuselage.

Specifications

	Monoplane	*.Biplane*
Engine, Renard 100	110 horsepower	110 horsepower
R.P.M. (Maximum)	1600	1600
Wing area	200 sq. ft.	280 square feet
Elevator area	14.5 sq. ft.	14.5 sq. ft.
Rudder area	7.5 sq. ft.	7.5 sq. ft.
Aileron area	21.5 sq. ft.	25.8 sq. ft.
Wing span	31 feet	30 ft. 8 in.
Length	23 ft. 3 in.	23 ft. 3 in.
Height	8 ft. 10 in.	8 ft. 10 in.
Weight empty	925 pounds	1,013 pounds
Useful load	484 pounds	484 pounds
Total weight	1,600 pounds	1,690 pounds
Wing loading	8 lbs.—sq. ft.	6 lbs.—sq. ft.
Power loading	14.5 lbs. sq. ft.	15.3 lbs. sq. ft.
Maximum speed	117 m.p.h.	101 m.p.h.
Cruising speed	93 m.p.h.	84 m.p.h.
Landing speed	....	27 m.p.h
Climb to 1,000 meters	4 min. 25 sec.	4 min.
Ceiling	16,400 feet	19,000 feet
Radius of action	435 miles	385 miles

THE PRODUCTION OF LEBLOND ENGINES

THE LeBlond Aircraft Engine Corp., Cincinnati, Ohio, has been turning out two engines daily, with the hope of ultimately reaching a production schedule of ten per day to meet requirements. To this end, night shifts have been established in several departments and plans are being formulated for an increase in factory space and manufacturing equipment.

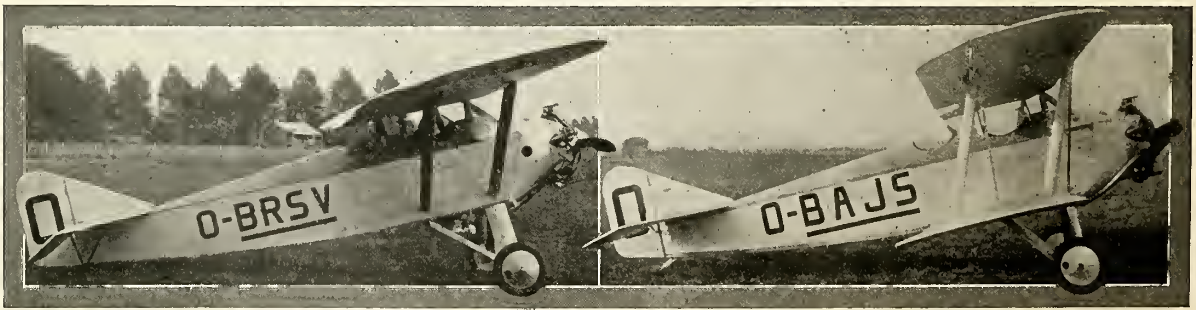
Although but 14 months old, the organization has made itself felt in the aircraft industry and LeBlond equipped airplanes already are being flown from landing fields all over the country. Having passed the Navy tests, the LeBlond engine has been awarded an Approved Type Certificate by the Department of Commerce. The test demonstrated that the engine has ample power to meet every condition of flying, in planes for which it is designed, with excellent standards of low cost operation and durability.

At present the company manufacturers the LeBlond "60" and "90." Production of the "120" will begin in the fall. The space now utilized for manufacturing purposes covers a floor area of nine and a half acres. All buildings thereon are of modern concrete and steel construction, incorporating efficient methods for lighting, heating and sanitation. Machinery and equipment are the most modern available.

Successful operation of the engine is said to be due in great measure to the use of Permite aluminum alloy castings, manufactured by Aluminum Industries, Inc., of Cincinnati. Close proximity of the two factories, eliminating delay in delivery, is proving a big factor in LeBlond production.

Although a youngster in the air field, the LeBlond Aircraft Engine Corp. has behind it the prestige of the R. K. LeBlond Machine Tool Co. and the financial strength of that organization, which gives it a substantial position in the aircraft manufacturing field.

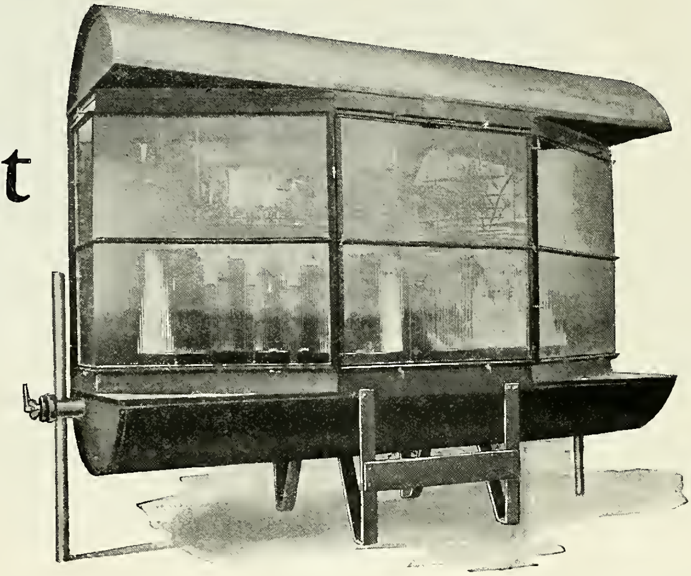
Separate engineering, experimental and manufacturing departments are maintained and the aircraft engine company is a separate organization, although enjoying the right to draw upon the facilities of the R. K. LeBlond Machine Tool Co. With the start of operations in Cincinnati a little over a year ago, five employees were on the payroll. Today there are 70 men employed in the production department.



The Belgian R. S. V. two-seater as a parasol monoplane and as a conventional biplane. (Built in America by Gates Aircraft Corp.)

LIGHT WILL PUT YOUR AIRPORT ON THE NIGHT MAP OF AMERICA

The New G-E Airport Floodlight



MOST POWERFUL

MOST EFFICIENT

MOST RELIABLE

NO OTHER single unit produces so much light with so little glare. Eight 3000-watt lamps are used. The light from them is distributed evenly through 180 degrees and glare is minimized by confining the beam to a low height above ground.

No other unit is so efficient. The adjustable reflectors make certain the proper light distribution on any field. The unit is totally enclosed and self-cooled. It has no ventilator or fan.

No other unit is so reliable. Should several of the lamps burn out, the light on the field is sufficient to afford visibility for night landings. This unit is suited for remote control and does not require an attendant.

Port Columbus, the first stop on the T. A. T. route, has adopted this unit for field floodlighting. Complete information is available at the nearest G-E sales office.

For ten years, General Electric has manufactured equipment specially designed for airport and airway lighting. In fact, a majority of the equipment in use to-day bears the G-E monogram. Look for this emblem also on MAZDA lamps, transformers, control equipment, and cable.

711-31

JOIN US IN THE GENERAL ELECTRIC HOUR, BROADCAST EVERY SATURDAY AT 8 P.M., E.S.T. ON A NATION-WIDE N.B.C. CHAIN

GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y., SALES OFFICES IN PRINCIPAL CITIES

THE AIR SERVICES

AIR CORPS CONSTRUCTION BILL INTRODUCED

A BILL to authorize expenditures of $4,529,354 for construction during 1932 of Army Air Corps buildings and improvements was introduced into the House of Representatives on May 9 by the Hon. W. Frank James of Michigan. This authorization bill is in accordance with the general plan adopted by Congress in 1926 for the development of the Army Air Corps under a five-year program, and provides for specific expenditures as follows:

Chanute Field, Rantoul, Ill.: Hangars and field shop, $149,000; central heating plants, $50,000; paved aprons, $53,700.

Crissy Field, Presidio of San Francisco, Calif.: Appurtenances to hangar, $10,000; paved aprons, $15,000.

Duncan Field, San Antonio, Texas: Hangar, $50,000; paved aprons, $50,000.

Fairfield Air Depot, Fairfield, Ohio: Paved aprons, $50,000.

Shreveport, La., (attack wing): Hangars, $275,000; field shop, $50,000; headquarters and operations buildings, $35,000; photo building, $36,000; radio, parachute, and armament buildings, $15,000; central heating plants, $75,000; gas and oil storage, $20,000; paint, oil, and dope warehouse, $10,000; paved aprons, $200,000; improvement of landing field, $165,000.

Wheeler Field, Hawaii: Paved aprons, $90,000.

Dodd Field, Fort Sam Houston, Texas: Appurtenances to hangar, $10,000; paved aprons, $15,000.

Langley Field, Va.: Hangars, $100,000; wing headquarters buildings, $25,000; paved aprons, $99,000; improvement of landing field, $15,000.

Fort Leavenworth, Kan.: Paved aprons, $15,000.

Marshall Field, Fort Riley, Kan.: Paved aprons, $15,000.

Maxwell Field, Montgomery, Ala.: Appurtenances to hangars, $50,000; central heating plants, $50,000.

Mitchel Field: Paved aprons, $53,000.

France Field, Canal Zone: Administration building, $20,000; hangars, $100,000; improvement of landing fields, $600,000.

Philippine Department: Hangars, $225,000; depot shop, $160,000; field shop, $60,000; field warehouse, $45,000; depot warehouse, $200,000; headquarters and operations buildings, $60,000; photo, radio, parachute, and armament buildings, $86,000; gas and oil storage, $30,000; paint, oil and dope warehouse, $20,000; paved aprons, $68,000; improvement of landing field, $50,000.

Rockwell Air Depot, San Diego, Calif.: Hangars, $150,000; headquarters building, $40,000; gas and oil storage, $10,000; paint, oil and dope warehouse, $15,000; improvement of landing field, $40,000; paved aprons, $30,000.

Post Field, Fort Sill, Okla.: Hangar, $30,000; central heating plant, $20,000; paved aprons, $15,000.

Scott Field, Belleville, Ill.: Hangars, $100,000; field shop, $85,000; field warehouse, $45,000; headquarters and operations buildings, $40,000; photo, radio, parachute and armament buildings, $61,000; school building, $40,000; central heating plant, $50,000; gas and oil storage, $12,000; paint, oil and dope warehouse, $10,000; improvement of landing field, $50,000; paved aprons, $15,000.

Edgewood Arsenal, Maryland: Hangars, $50,000; heating plant, $20,000; gas and oil storage, $5,000; paved aprons, $15,000.

Fort Bliss, Texas: Gasoline storage system, $1,654.

Hatbox Field, Muskogee, Okla.: Operations building, $5,000.

Dallas, Texas: Operations buildings, $5,000.

International Newsreel Photo

Lieut. Al Williams receives Distinguished Flying Cross. Left to right, Mr. A. J. Williams, Mrs. A. J. Williams, Jr., Lt. Al Williams, Mrs. Williams (mother), and Miss Frances Williams (sister).

NAVY BOARD TO STUDY AIRSHIP BASE SITES

SECRETARY of the Navy Adams appointed a board on May 8 to investigate sites suitable for the establishment of a naval airship base. This board is composed of Rear Admiral William A. Moffett, U. S. N., chief of the Bureau of Aeronautics; Rear Admiral Joseph M. Reeves, U. S. N., general board; Comdr. Garland Fulton (C.C.), U. S. N., in charge of lighter-than-air division; Lieut. Comdr. Charles E. Rosendahl, U. S. N., in charge of rigid airship training and experimental squadron and recorder of 4th Naval District, Philadelphia, Pa.

In accordance with the recommendations of the general board that the base should preferably be in the Los Angeles-San Diego area, the board will restrict its investigation to this area. It will report upon the most suitable locations, together with estimates in detail of cost of the best sites available, and of the structures, facilities, and improvements necessary to the efficiency of the airship base.

D.F.C. TO LT. WILLIAMS

LIEUT. ALFORD J. WILLIAMS, U. S. Navy, was awarded the Distinguished Flying Cross at the Naval Air Station, Anacostia, D. C., on May 17, for his inverted flight experiments during March, 1928. The medal was awarded by Secretary of the Navy Adams.

In the Naval Secretary's words, Lieut. Williams received the award for "extraordinary achievements while participating in duly authorized aerial flights during the month of March, 1928, in which he made a study of the action and best methods of control of a violently maneuvered airplane in inverted flight. These and many other flights made by Lieutenant Williams in the

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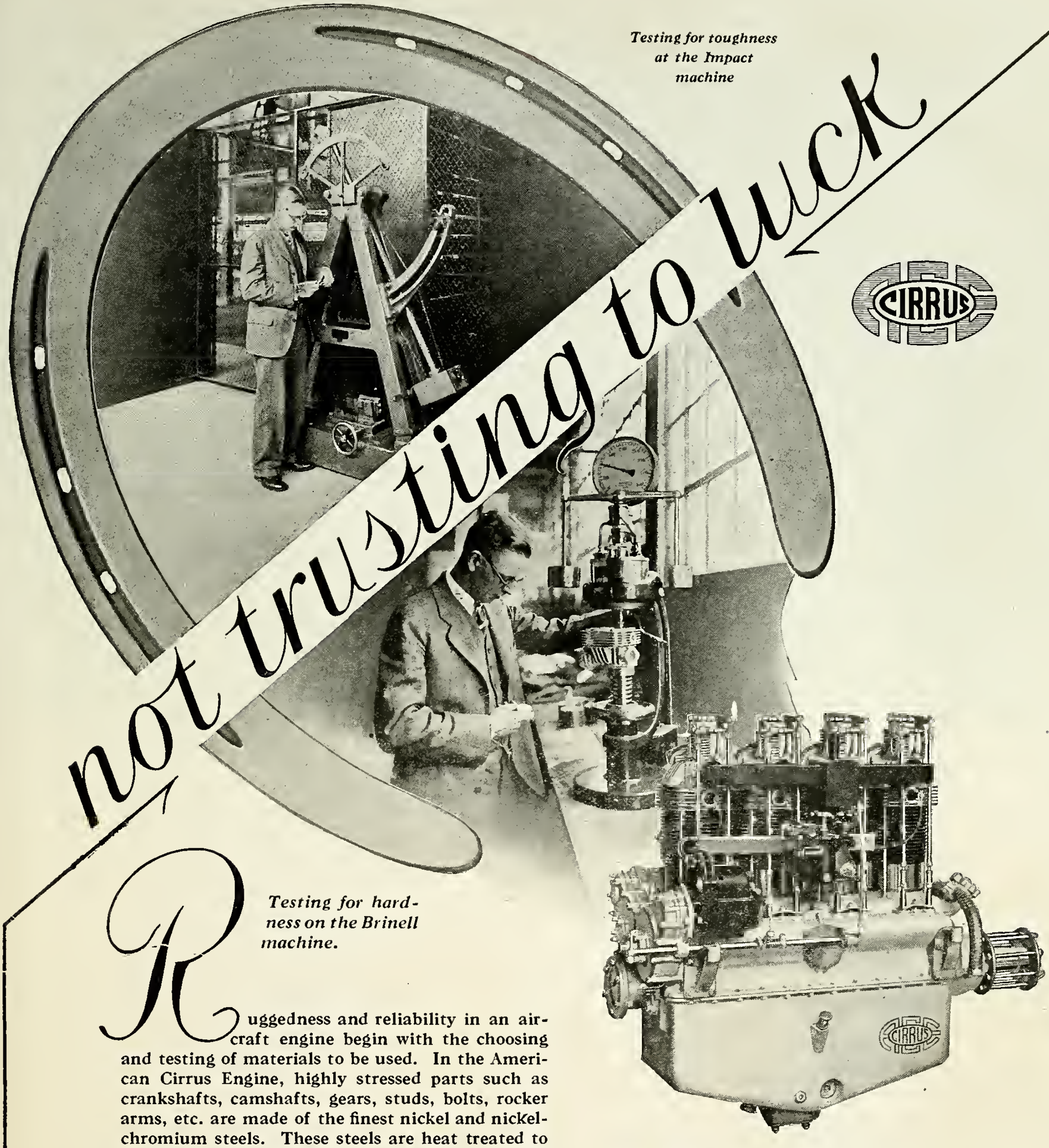


Testing for toughness at the Impact machine

Testing for hardness on the Brinell machine.

Ruggedness and reliability in an aircraft engine begin with the choosing and testing of materials to be used. In the American Cirrus Engine, highly stressed parts such as crankshafts, camshafts, gears, studs, bolts, rocker arms, etc. are made of the finest nickel and nickel-chromium steels. These steels are heat treated to give the desired physical properties and are then passed through a complete chemical and metallurgical test in our laboratory, which is equipped with the best and most modern machines for this purpose. Our test specifications are extremely high and the materials that meet these qualifications assure the engine extreme reliability and long wearing qualities in performance. These are not matters of luck but are caused by the proper choosing and testing of material.

AMERICAN CIRRUS MARK III

AMERICAN CIRRUS ENGINES, INC.

WASHINGTON AVENUE, BELLEVILLE, N. J.

(Continued from preceding page)

even though he was well aware of the danger involved. As a result of his flights and studies he was able to evolve certain principles and to make practical application of them to the end that aerial maneuvers have been made safer and methods have been developed for more fully and accurately testing the capabilities of various types of airplanes."

Curtiss Marine Trophy Race

THE Curtiss Marine Trophy race for service seaplanes was to be held on the Potomac River at Washington on May 26, over a hundred-mile course. The various contestants were divided into five groups, according to the type of plane used. The Hamilton Watch Co. contributed five gold wrist watches as prizes for the winners.

LIST OF THE ENTRIES

Fighting Planes

Curtiss Hawks—Air-cooled

Captain James T. Moore, U.S.M.C., Quantico, Va.

Captain Arthur H. Page, U.S.M.C., Quantico.

Lieutenant William O. Bryce, U.S.M.C., Quantico.

Lieutenant Alan P. Flagg, U.S.N., Bureau of Aeronautics.

Observation Planes

Vought Corsairs—Wasp Engines

Lieutenant E. W. Rounds, U.S.N.R., Naval Air Station, Anacostia.

Lieut. Commander J. E. Ostrander, U.S.N., Bureau of Aeronautics.

Lieutenant William D. Sample, U.S.N., U.S.S. *New York.*

Lieutenant Walthos A. Maser, U.S.N., U.S.S. *Arizona.*

Lieutenant Joseph E. Kane, U.S.N., U.S.S. *Arizona.*

Loening Amphibians, Wasp engines

Lieutenant Carleton McGauley, U.S.N., Naval Air Station, Hampton Roads, Va.

Chief Boatswain George H. Groh, U.S.N., U.S.S. *Lexington.*

Lieutenant Henry F. McComsey, U.S.N., Naval Air Station, Anacostia.

Torpedo Planes, Hornet engines

Lieutenant Willis E. Cleaves, U.S.N., U.S.S. *Wright.*

Lieutenant R. W. D. Woods, U.S.N., U.S.S. *Wright.*

Lieutenant Guy D. Townsend, U.S.N., U.S.S. *Wright.*

Lieutenant (J. G.) Hallsted L. Hopping, U.S.N., U.S.S. *Wright.*

Alternates for Torpedo Planes

Lieutenant William J. Slattery, U.S.N., U.S.S. *Wright.*

Lieutenant Daniel V. Gallery, Jr., U.S.N., U.S.S. *Wright.*

Training Planes, Whirlwind engines

Lieutenant James H. McKay, U.S.N., Hampton Roads, Curtis Fledgling.

Lieutenant Mills R. Browning, U.S.N., Consolidated plane.

Lieutenant Samuel H. Arthur, U.S.N., Keystone plane.

AMPHIBIONS FOR NAVAL ACADEMY

FOUR Sikorsky amphibions have been contracted for by the Department of the Navy from the Sikorsky Manufacturing Corp. of College Point, L. I., to be used in aviation training at the Naval Academy at Annapolis. The planes, which are each powered by two Pratt and Whitney Wasp engines, will be used in a course of several hours in the air given to all midshipmen to familiarize them with aeronautical operations. The subjects covered by the air course will be navigation, gunnery and radio, and will be given during the second summer class.

Passenger space in the planes hitherto used has been restricted to two gunner's cockpits and a limited area within the hull, and since this arrangement made communication extremely difficult, many flights were necessary to give individual instruction. The cabin arrangement of the new Sikorsky is such that it is practical for group instruction. In addition to the pilot and mechanic, at least seven students and an instructor will be taken on each flight. Ordinary conversation may be carried on within the cabin, thus greatly facilitating the work, effecting a considerable saving in time, and reducing the number of flights necessary and the planes and personnel required.

Reserve Navy Training Resolution

PROVISION for the training of naval reserve pilots who come from colleges and universities and who were not fliers at the time of their enlistment, was made in a resolution passed by the House of Representatives on May 1. The bill, which amends an appropriation for the Naval Reserve for 1930, was introduced by Representative French of Idaho.

AIR CORPS EXAM

COMPETITIVE examinations for appointment as 2nd lieutenant in the Air Corps of the Regular Army will be held at Bolling Field, Anacostia, D. C., and Langley Field from June 24th to 29th. Candidates must be between 21 and 30 years of age.

Eligibility to compete in the examination will be confined to candidates who fulfill the necessary mental, moral and physical qualifications for appointment as 2nd lieutenants in the Regular Army, who have graduated from the Air Corps Primary Flying School or from the Air Corps Advanced Flying School within the past six years. All applicants who have not graduated from the Advanced Flying School within one year from the date of making application for examination will be required to demonstrate their proficiency as pilots before the board conducting their examination.

DUE to Lieut. L. A. Pope's being transferred from the *U. S. S. Cincinnati* to Pensacola Flying Station, the plan to present him at a dinner with the Southern Cross Trophy, which he won at Newport last summer, had to be abandoned. The trophy was presented to him recently at the office of Lorillard Spencer in New York City.

The Southern Cross Trophy was presented in 1928 to the Narragansett Bay Regatta Association by Lorillard Spencer, at the time president of the Fokker Aircraft Corporation of America, to be competed for annually by all types of airplanes at Newport, R. I.

NAVY AIRCRAFT MOVEMENTS REPORTS

NEW instructions for aircraft communication have been given by the Navy Bureau of Aeronautics and the director of naval communication to simplify reports and to relieve the load on communication circuits. The revision omits the Chief of Naval Operations and the Commandants of intervening districts from the address, and changes the present system of designating the types of planes in movement reports.

The type designated to be used in the future refers to the type of squadron to which the plane is attached rather than the type of plane as now used. The squadron designating terms to be used are: Training, Fighter, Bomber, Observation, Scout, Torpedo, Patrol, Utility.

ANNAPOLIS AIR STATION PERMANENT

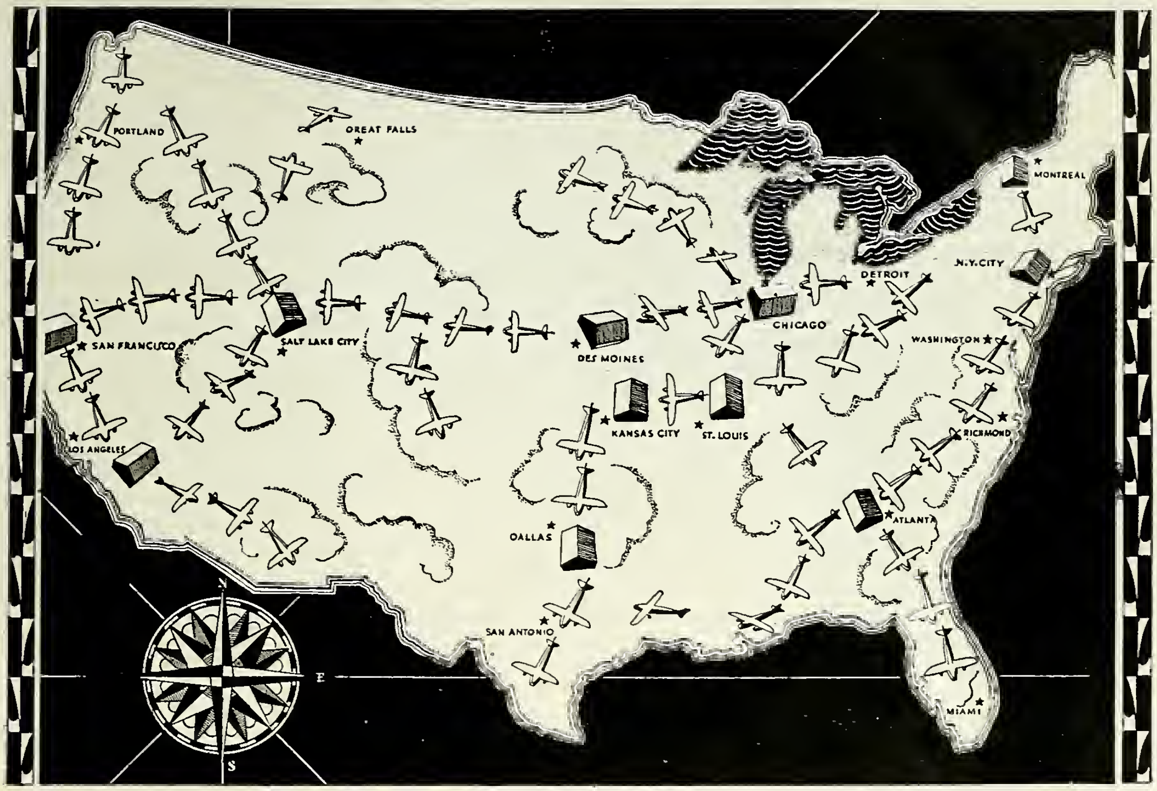
BECAUSE of the growing importance of the course in aviation at the Naval Academy, the flying station at Annapolis is to be made a permanent establishment, at which a squadron of aircraft will be maintained at all times. The squadron will be composed of eight planes, and will be commanded by Lieut. Comdr. W. Witt C. Ramsay, with Lieut. Chester A. Sprague as executive officer.

Instruction in aviation and allied naval subjects will begin for the 550 members of the second class about June 10 and will continue until the latter part of August. Under the system recently inaugurated at the Naval Academy, members of the class who receive instruction in aviation during the summer will continue practical work in it during their last year at the academy.

Balloon Patch System

THE Army and Navy aeronautic personnel has given much attention to the new patch system of attaching the basket to a balloon which was used on one of the Army entries in the National Elimination Balloon race held in Pittsburgh, May 4. Twenty patches together with a circumferential reinforcing band are attached to the envelope about two feet below its center or equator. Each of these patches will stand a stress of 500 pounds. From each patch extends a single rope to the basket.

The advantage of this method is the elimination of a considerable amount of dead weight and the accumulation of other weight due to atmospheric conditions. The ordinary network often collects moisture.



A VAST TESTING LABORATORY

that points to one conclusion!

THE air mail service—flying a daily average of 38,000 miles—is the vast testing ground of aviation, where theories and materials get their baptism of fire—where their weaknesses are found out—their strengths developed.

From this testing laboratory has come the inescapable conclusion: Aluminum and its alloys are sure to play a part of ever-increasing importance in the development of aviation.

Already more than one half the material in the modern airplane engine is Aluminum alloy, with a weight saving of more than 50% over iron or steel.

Forged Aluminum alloy propellers with an almost everlasting life have displaced easily shattered wood with its average life of less than 200 flying hours.

And there is hardly a part of the fusilage to which designers are not applying Aluminum alloys with a consequent gain of strength, durability and safety.

Aluminum Company of America offers a dependable supply of Alclad sheet and tubes; and of castings, forgings and screw machine parts, made of Aluminum and its alloys. Inquiry, correspondence and personal contact with our technical staff is invited.

ALUMINUM COMPANY OF AMERICA
2484 Oliver Building, Pittsburgh, Pa.

Offices in 19 Principal American Cities
Aluminum in Every Commercial Form

ALUMINUM AND ITS ALLOYS
for Aircraft

WESTERN NEWS

DUTIES OF A SALES MANAGER

By O. R. Hauter
Assistant Sales Manager, Alexander Aircraft Co.

A SALES manager should consider himself a servant of the company he represents, of the distributors, of the dealers and representatives selling the product, and of the customer.

Absolute fairness and impartiality are necessary in all dealings—in considering complaints, criticisms, adjustments and territory allotments.

He must consider the company, its policies, plans and ideals as well as the distributor's problems and ambitions.

Volume sales, at a profit, are of course the aim of every sales manager. It is not difficult to get volume if net profit is disregarded. And profits can soon be eaten up in concessions, adjustments, advertising, sales promotion, etc., if not properly regulated.

The sales manager must be constantly on the alert for new ideas, systems and plans to assist the distributors and dealers in the development of their organizations and territory.

In addition he must study the question "What do the majority of the consumers want?" in order to give the salesman a product meeting with a minimum of sales resistance.

The best product in the world will not sell itself. Advertising is *one* important link in the chain of distribution. The product must appeal to the consumer, the salesman must understand the product *and push it*, then—advertise so people will know his product and will give it a trial.

All products can be divided into four parts; namely, demand, quality, features, and price.

If the demand for what you make is latent or partially so, the problem is to awaken this demand and supply it with your product. Business is built on repeat trade in this day and age. The buyer does not have to beware lest he get inferior quality—instead the seller had best beware lest his product is not good enough to bring the customer back for more.

Considering first the quality of your product, your price must be in accord with other similar articles of equal merit. The price must be such that it pays the cost of manufacture plus general overhead, the selling cost, a profit for the manufacturer, and a profit for the distributor.

Definite sales policies eliminate the annoyance of continually having to decide petty, minor questions—they prevent complicated situations and keep the road clear for rapid progress. These policies to be sound must represent the consensus of opinion of all those involved in the distribution and marketing.

A sales manager must insist upon regular reports of activity. Otherwise he cannot act intelligently in increasing or decreasing territory.

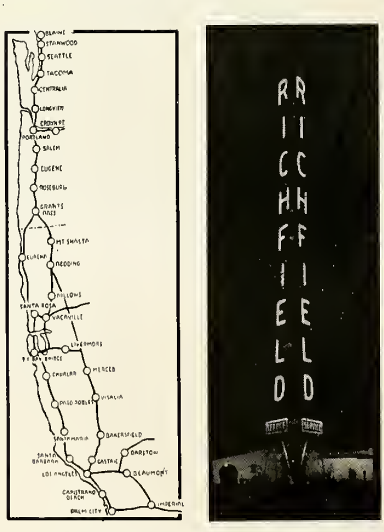
In conclusion, my idea is that to be successful a sales manager must see that the customer gets his money's worth; that distributors make a profit and are given full coöperation and that they consistently work all territory allotted to them; and that his company make a profit.

RICHFIELD BEACONS

FOURTEEN aviation beacons of the Richfield Oil Company have been put into use, and 20 more are being erected in the chain of the oil company's lights which extend along the Pacific Coast fifty miles apart. These beacons are triangular in shape, of steel construction and 125 feet in height, with the word "Richfield" in Neon lights on two sides.

These beacons are visible in clear flying weather for a distance of 50 miles. The towers are to be surmounted by an 8,000,000 candlepower rotating light with a directional light of the same intensity, pointing the way to the nearest airport. These beacons are all at, or adjacent to, airports, a number of which are under the management of the Richfield Oil Company.

In conjunction with these towers, automobile service stations are being erected and are already in use at the beacons now operated in California at Imperial, Palm City, San Juan Capistrano, Beaumont, Castaic, Santa Maria, Paso Robles, Visalia, Merced, Livermore, Santa Rosa and on the new seven-mile San Francisco Bay Bridge. Locations have been selected and construction crews are either working or preparing to work at Barstow, Bakersfield, Vacaville, Willows, Redding, Eureka and Mount Shasta, California; Grants Pass, Roseburg, Eugene, Salem and Crown Point, Oregon; and Longview, Centralia, Tacoma, Seattle, Stanwood and Blaine, Washington.



Left: Map showing locations of Richfield Oil Co. beacons on West Coast. Right: a beacon illuminated.

PACIFIC DIRIGIBLE SERVICE

PACIFIC air mail and passenger service using dirigibles has been proposed to the United States Government by the Goodyear-Zeppelin Company and two New York banking houses. The service would link the Western Coast with Hawaii, and would eventually be extended to Tokio and other Oriental centers, and to South America and Europe. If given coöperation and encouragement by the Post Office, Commerce, Navy and War Departments, the plans will go forward at once.

The tentative arrangements call for construction of two super-dirigibles of 6,500,000 cubic foot capacity each, which would be commercial prototypes of the two military airships now being built at Akron for the Navy. The contemplated ships would have accommodations for 60 to 100 passengers and cargo space for 10,000 to 20,000 pounds of mail, express and baggage.

TAKING "THE SNYDER"

TEN months ago the Boeing System decided that, just like the railroad man's watch, the air mail pilot should be taken into the repair shop for testing. When pilots reach Omaha on the transcontinental, they go to the office of Dr. J. A. Tamisiea, flight surgeon for the eastern division of the Boeing System. There they submit to the Army flying test, the pulse, blood pressure, eyes, teeth, ears, etc. The pilots manipulate the Howard Dohlman depth percepter, and various other tests of equilibrium and of vision. Because one Dr. Snyder worked out the test, it is known as "The Snyder."

"How's your health?" is no longer asked when Boeing pilots meet.

"How's your Snyder?" is the way it's specifically put.

And if the questionee answers, "Eighteen," it means he's feeling mighty fine and is fit to fly.

But if he responds with a rasping cough, "Just four," it means that he's certain to be "set down" as temporarily unfit for flying on the Boeing air mail, express and passenger route.

The Government allows Army pilots to function with a Snyder of 8. The Boeing

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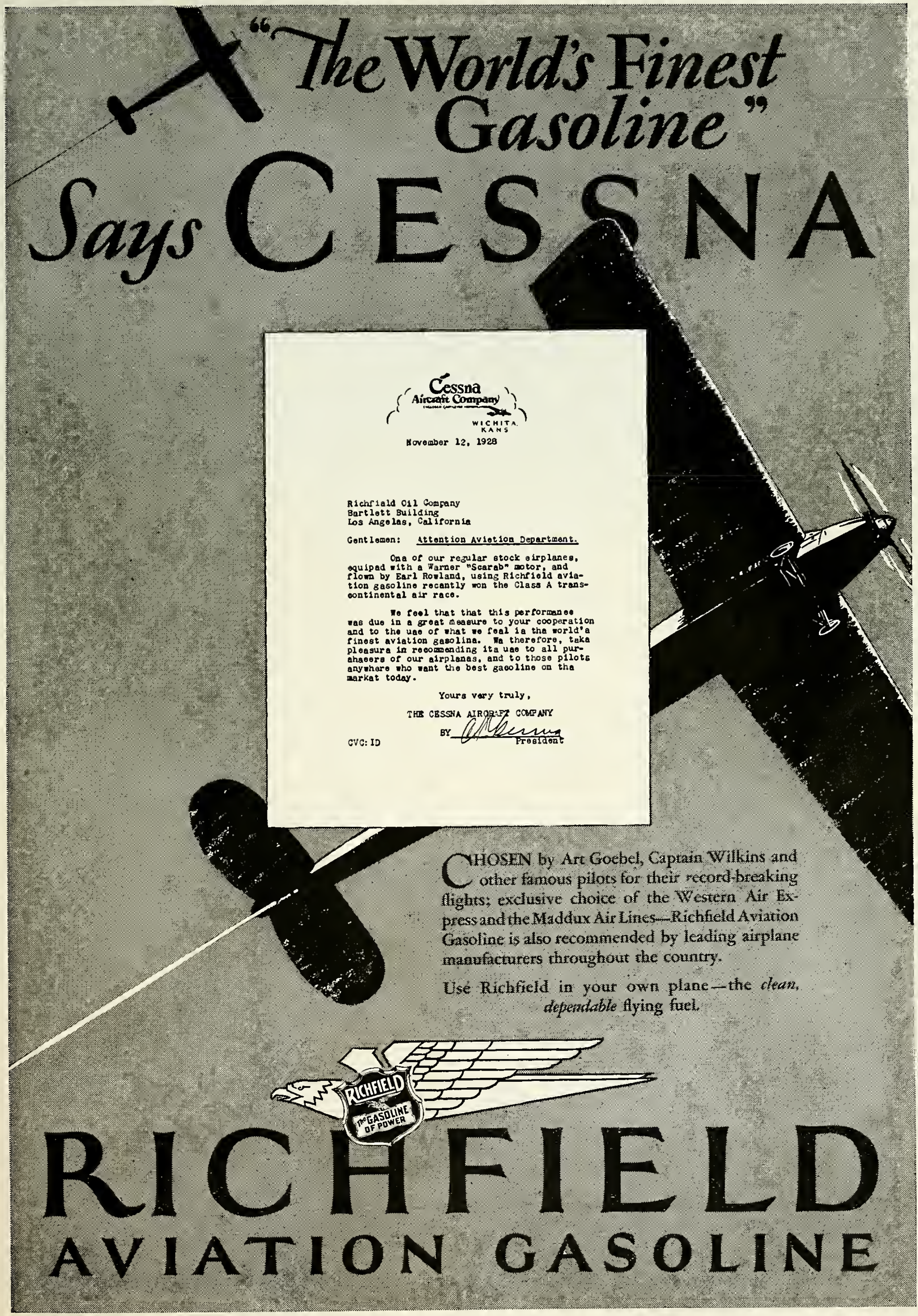


Cessna
Aircraft Company
WICHITA
KANS

November 12, 1928

Richfield Oil Company
Bartlett Building
Los Angeles, California

Gentlemen: Attention Aviation Department.

One of our regular stock airplanes, equiped with a Warner "Scarab" motor, and flown by Earl Rowland, using Richfield aviation gasoline recently won the Class A transcontinental air race.

We feel that that this performance was due in a great measure to your cooperation and to the use of what we feel is the world's finest aviation gasoline. We therefore, take pleasure in recommending its use to all purchasers of our airplanes, and to those pilots anywhere who want the best gasoline on the market today.

Yours very truly,

THE CESSNA AIRCRAFT COMPANY

BY
President

CVC: ID

CHOSEN by Art Goebel, Captain Wilkins and other famous pilots for their record-breaking flights; exclusive choice of the Western Air Express and the Maddux Air Lines—Richfield Aviation Gasoline is also recommended by leading airplane manufacturers throughout the country.

Use Richfield in your own plane—the *clean, dependable* flying fuel.

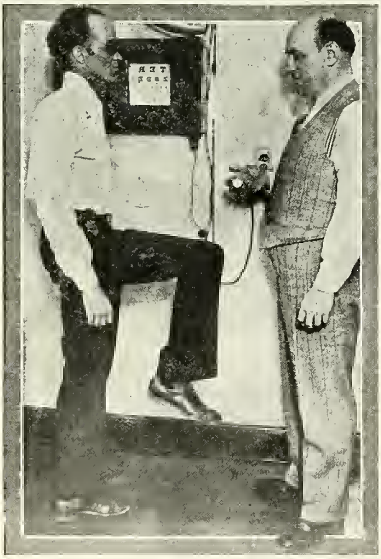
(*Continued from preceding page*)

company requires a minimum score of 10 for flying. The highest possible score is 18. Boeing officials figure that a pilot with a Snyder of 10 or more can negotiate a route which calls for flying from sea level to 12,000 feet over the mountains.

The Boeing System, which just completed five million miles of flying, attributes its performance record not only to the stamina of Boeing planes, but also to the ability and condition of its pilots. Boeing System now employs fifty-eight pilots.

In the Snyder test, pulse and blood pressure are taken, before and after exercise, and a comparison is made between the two results for the final ratio.

Passing the Snyder, however, does not relieve the Boeing pilot from medical examination. In addition to this monthly test, each air mail pilot has to be examined twice a year for the Government. If the Boeing physician finds the Snyder test is low, it is up to him to discover why and to rectify the error. Bad teeth, tonsils or sinus trouble may be the fault. Because these examinations have resulted in correction of ailments and added to the pilots' efficiency, pilots themselves are the best boosters for the system.



Jack Knight, Boeing pilot, testing his equilibrium

OAKLAND MUNICIPAL AIRPORT has the first installed airway radio station of a Pacific Coast chain of stations of the Department of Commerce. A 500-watt transmitter has been transferred to Oakland from the Concord reserve field and this will be used for broadcasting reports until a 2500-watt transmitter is received from the East. Reports will be broadcast day and night, and the radio station is linked with the Oakland Airport Weather Bureau.

A NEW type face mask for cold weather flying has been designed by Lieut. Frank Barber, Boeing air mail pilot at the Oakland Municipal Airport base. The mask is attached to the helmet by snaps.

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CONTACTS

By F. E. Samuels

ON a recent trip through central and northern California, I was particularly impressed by the increasing activity of the industry in that section and the number of new flying fields and airports. Traveling north by way of the Coast Highway, my first stop was at the Chadbourne-Donze Air Service port, situated five miles east of Ventura and a quarter of a mile west of the Santa Clara River. The flying field is 1,500 feet long and 430 feet wide. Student instructions, taxi service and cross-country flights are featured and business is better than good.

TWENTY-TWO miles farther brought me to the second flying field of the Chadbourne-Donze Air Service, Inc. This field is situated ten miles south of Santa Barbara and one half mile south of the town of Carpinteria. The field has two runways, one 1,800 by 450 and the other 1,000 by 350. Mr. Jack Chadbourne is president of the corporation, and Mr. Robert L. Donze, ex-member of the La Fayette Escadrille, is the general manager. The equipment consists of ten up-to-date planes of different makes.

JUST north and west of Santa Barbara, Earl Ovington has his private flying field, on a plateau on the side of a hill. Earl is very proud of his flying field and is continually improving it. Earl was the first pilot to fly air mail in this country.

MY next stop was at the Santa Maria Airport, where Mr. G. Allen Hancock founded the Hancock Foundation College of Aeronautics. This institution is fully described in this issue of AERO DIGEST.

FOUR miles due east of San Jose is the flying field of the Mead and Orr Flying Service. Student instruction, short flights, and aerial taxi service is featured there. San Jose is the terminal of the shortest air mail route in this country, starting at San Jose and connecting with the transcontinental air mail at Oakland, a distance of less than sixty miles.

LEAVING San Jose, my next stop was at the Palo Alto School of Aviation, owned and operated by Lieut. Norman A. Goddard. Lieut. Goddard has the Waco agency and is doing a fine business in student instruction, short flights, and cross-country trips.

A BEAUTIFUL drive through a wonderful country brought me to Mills Field, the San Francisco municipal airport. This was one of the first municipal airports on the West Coast, has over forty planes operating from the port, is the terminal of the Union Air Lines, and is a modern equipped airport in every respect.

A TRIP across the bay by ferry brought me to Alameda Airport. In less than a year this privately owned airport has grown from ocean front mud flats into a veritable aviation city, with hotel, airplane terminal depot, large and roomy hangars, administration building complete with meteorological department, weather bureau, restaurants, etc. The Maddux Airlines make this port their northern terminal, and the Royle Aircraft Corp. and flying school make it their operation base.

JUST a short drive was required to reach the S. F. Airdrome, Inc., flying field. This is another privately owned airport where a number of commercial planes are quartered, and where short flights are the specialty.

I NEXT went to the Oakland Municipal Airport, made famous by the Dole Flight, the *Southern Cross* start, and many other epochal aviation events. This airport is the northern terminal of the Western Air Express. The Boeing Air Transport, air mail and passenger service and over fifty commercial and privately owned planes make it their base of operations. The airport is the last word in buildings, equipment, runways and everything that goes to make up a modern air terminal.

HAVING followed the coast thus far, I struck inland, heading for the San Joaquin Valley. I was fortunate enough to reach Tracy in time for the dedication of the new airport. The American Legion was conducting the opening. The airport will be run under the auspices of the Legion, and since it is on the direct airline between Los Angeles and San Francisco, it should be a great help to pilots flying north or south.

FORTY miles farther is the Merced Airport, owned and operated by Gallison and Tedrow, who during the summer months, run an airline between Merced and Wawona, which is right on the edge of the Yosemite National Park. Between seasons they give students instruction and fly short hop passenger flights.

JUST five miles from the city is the Fresno Airport. This field is a port of call for the Maddux Airlines, and all other airlines flying north or south use the airport for refueling and emergency calls. The Eagle Flying School using the Rankin System, as well as being the American Eagle dealer, makes the port its base of operations. The company has other fields at Porterville, Tulare and Kings.

(*Continued on next page*)

GENTLEMEN HERE IS A *SHIP*!

In offering the Moreland M-1 to the public we do so with the sincere belief that the purchaser of an airplane is entitled to expect the same fine craftsmanship and design features which go to make the modern motor car the dependable and even luxurious means of transportation it is. We have spared no effort or expense to produce an airplane that offers the optimum in appearance, comfort, safety and inherent structural strength.... a lasting guarantee of trouble-free service and performance. We pledge ourselves to build only that kind of ship on which we may be proud to place our name, as we realize fully that only in this way may we hope to merit the confidence of the hosts of air travelers of the future.

There is still some dealer and distributor territory open.
Write for complete details.

MORELAND AIRCRAFT
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(*Contacts continued*)

ANOTHER airport near Fresno is the flying field of the Center State Aviation School, of which H. L. Mullen is owner and operator. The Center State Aviation School and the San Joaquin College of Commerce have recently merged and are establishing a college of aeronautics in Fresno, with offices and classrooms at the College of Commerce and Mr. Mullen in charge of the aeronautical department.

MY next stop was at the Visalia Municipal Airport, five miles northwest of the city. Improvements have been progressing steadily at this airport. The Sequoia Airways school of flying makes its headquarters at this port, and a number of commercial and privately owned planes have hangar space.

LEAVING Visalia, I stopped at the Tulare flying field, situated about three miles south of the town of Tulare. Unfortunately, I was so late on arriving, there was no one at the field.

FIVE miles north of the city of Bakersfield I came to the Kern County municipal airport, another important aviation enterprise. This airport is also a point of call of the Maddux Airlines. The Cardiff and Peacock Flying School and the Kern County Air Service both make the port their base of operations; and some thirty commercial planes, as well as a number of private planes, are housed in the commodious hangars. The buildings and equipment of the airport are up-to-the-minute. Moreover, the airport is being operated at a profit.

THERE are a number of emergency fields, as well as a few commercial flying fields along both the shore and the valley routes, which I could not visit. But I hope to visit them all in the near future. The kind and courteous treatment of everyone connected with the aviation industry along the route has left a lasting impression with me. If they had had their way I should have been a month in making the trip instead of nine days.

WHILE at Clover Field I watched the take-off and performance of the first of a carload of TPs just received by Jim Granger, who has the Swallow agency for that territory. The little two-place training plane is a nifty little ship, meeting all of the requirements necessary for the purposes for which it is intended. The arrangement of the dual control system, which enables the instructor, by simply pulling a lever, to release both the rudder and stick control from the student, is simple and effective.

WITH the completion of the new mill, operating and assembly buildings, which have been added to the Bach Aircraft plant at the Los Angeles Metropolitan Airport, the company has started on a one-a-week production basis, with orders enough ahead to continue this schedule for a year. There are continually eight 10-place trimotored ships under different stages of construction in the main building at a time. Two hundred skilled workers are employed. Work has been started on the Commercial Aircraft Company's new factory, where one hundred workmen are being engaged. This growth at the Metropolitan Airport, together with the construction of two new hangars, brings the total investment to well over the million dollar mark.

THE Culver City Airport Corp. has been appointed distributor in California and Arizona for the products of the St. Louis Aircraft Corp., of St. Louis, Mo. This ship is the Cardinal, a two-place cabin monoplane, equipped with brakes, wheel tail skid and complete line of instruments.

Work has been started on the new Studio Flying Club house at this airport. The club now consists of over forty members, all of whom are prominent in the motion picture industry.

AN Eaglerock plane, owned by the Marchetti Motor Patents, Inc., of San Francisco, arrived at the San Francisco airport from Porterville, Calif., on May 9th. This is one of the planes that this company will use for official and experimental purposes.

CALIFORNIA

HARRIS M. HANSHUE has been elected a member of the board of directors of the Aero Corporation of California, according to a recent report of Jack Frye, president of the concern. Besides Mr. Hanshue, the present Aero Corporation board consists of Jack Frye, Paul E. Richter, Jr., Walter A. Hamilton, Frank Hitchcock, Guy Witter, Robert L. Chambers and L. E. McNeil.

STANDARD AIRLINES, INC., has leased one hundred and sixty acres of land six miles northeast of El Paso on the El Paso-Carlsbad highway for its eastern terminal. An option was taken on the surrounding four hundred eighty acres to be developed later. Clearing and grading has been commenced and the erection of buildings will begin immediately. The building program calls for two steel hangars and a combination air terminal building and administration building.

S. A. SAGEHORN of Salinas, California, has been appointed an Alexander Eaglerock dealer by the Aero Corporation of California, distributor for Alexander Aircraft.

AIR passenger service between Kansas City and Los Angeles was to be inaugurated by Western Air Express about June 1, using 12-passenger Fokker cabin planes. Nine Fokkers of the type which will fly the route have been received by the company. A daily service in each direction will be maintained at first.

With the delivery of the new 12-passenger transports, Western Air Express officials have announced a six-day service per week between Salt Lake City and Los Angeles, instead of the four-day schedule previously maintained.

Fullerton Air Meet

A VERY interesting air meet was staged at the Fullerton Municipal Airport, May 18th, bringing together some of the best pilots from all over Southern California. The meet was held under the auspices of the Fullerton Post of the American Legion and drew a crowd of approximately ten thousand persons. The object of the meet was to influence the voters in the coming election to pass a bill to improve the present airport and to purchase additional ground to enlarge it. The Army and the Navy were represented by twelve planes, which gave exhibitions of formation flying. The transport company planes included a Fokker trimotor of the Western Air Express, a twelve-place trimotored Ford of the Maddux Air Lines, and a Fokker Super-Universal of the Standard Airlines. A number of privately owned cabin planes were also visitors at the opening.

HAROLD SNEAD has joined the flying personnel of the Aero Corporation of California as an instructor. Mr. Snead will give advanced training in cross-country and acrobatic flying to students enrolled in the advanced flying course offered by this company.

TWO amphibions, a Loening and a Sikorsky, are being operated between Los Angeles and Catalina Island by Western Air Express during the summer months in addition to the two flying boats formerly used. A Boeing seaplane has been ordered for service about the island.

WORK is progressing on the construction of a $250,000 factory unit for the airplane engine division of Axelson Machine Co., in Los Angeles. The contract for steel work was let to the Consolidated Steel Corp. When completed, the building will house the assembly departments of the airplane division of Axelson Machine Co.

Aircraft Finance Corp. Capitalized at $30,000,000

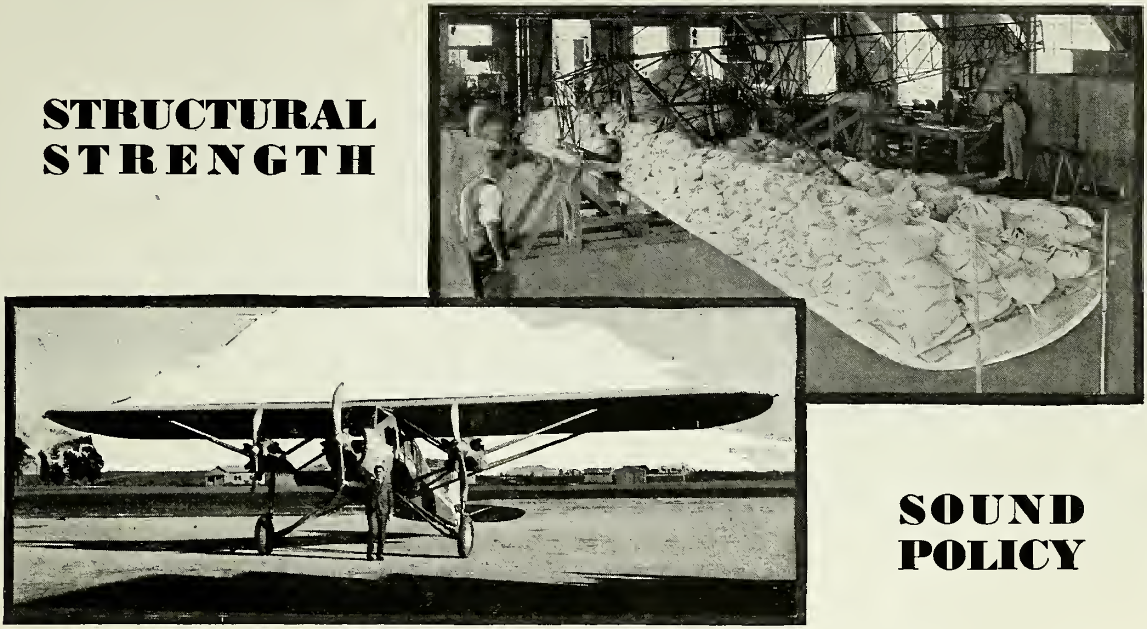
DUE to a typographical error in the May issue of AERO DIGEST the initial capitalization of the Aircraft Finance Corporation of America, recently organized at Los Angeles, was given as $30,000 instead of $30,000,000 which is the correct capitalization of this finance concern. This organization will be in national operation by the end of the summer, and will locate offices in New York, Chicago, and St. Louis.

A SECOND unit of the Kinner factory is now under construction, according to a recent announcement issued by the executives of the Kinner Airplane and Motor Corporation, Glendale, Calif. The new unit, which will double the company's production space, is made necessary due to the increased demand for Kinner engines.

During January, 1929, the Kinner organization occupied a new two and one-half acre factory at San Fernando Road and Colorado Blvd. Since January orders from aircraft manufacturers have absorbed the company's

(*Continued on next page*)

STRUCTURAL STRENGTH



SOUND POLICY

Two things we try to do well . . . build the Kreutzer Tri-Motor Air Coach and build into it every possible factor of dependability and continuous service . . . . and sell the Kreutzer Tri-Motor Air Coach on a basis which assures the distributor and the dealer a fair margin of profit while making a real saving for the ultimate purchaser.

And it is because we are doing these two things well that the Kreutzer Tri-Motor Air Coach is popular with Distributors, Dealers and Owners alike.

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SIX PLACE . . . DUAL CONTROL . . . CABIN . . . MONOPLANE

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(*California News continued*)

production capacity and made necessary the erection of the second unit. The new unit with a total of 9,340 square feet will be completed by the time new machinery arrives.

DAILY savings of from $500 to $750 by the use of air mail in transporting papers were reported by fourteen banks and banking groups of Los Angeles in a recent survey of air mail uses made by the Western Air Express. This saving, according to the figures compiled, totals over $2,500,000 per year in Los Angeles banks.

SAN FRANCISCO

SAN FRANCISCO'S airport at Mills Field has just completed its second year as a municipal ownership enterprise with a record of 50,322 flights and landings with 85,002 passengers, flown from and to all parts of America. The growth of commercial aviation there during the past year is reflected in a gain of approximately 525 per cent in flights and 600 per cent in passengers for the second year of Mills Field operation as compared with the total business of the first year. There were only 8,077 flights and 12,350 passengers from May, 1927, to May, 1928, as against 42,245 flights and 72,652 passengers from May, 1928, to May, 1929, according to the figures made public by Milo F. Kent, superintendent of the field.

OAKLAND

[HOWARD V. WALDORF]

ENDING a 7,000-mile survey flight over a proposed air mail route down the western coast of Mexico into Central and South America, Claire K. Vance, veteran air mail pilot, flying a Boeing mail plane recently landed at the Oakland Municipal Airport.

The flight was made via Brownsville, Tampico and Mexico City. Despite a heavy baggage cargo and three passengers, the survey was completed in 68 flying hours. At Mexico City, Vance, Dan Ellis, and Charles Parmalee, members of the party, were presented with Mexican transport licenses, the first issued by the newly created department of aviation. Guatemala City was the southernmost point of the survey. As a result of the survey, preparations are now being made to extend the Pacific Coast air mail service into Mexico and Central America. A. K. Humphries, assistant to the president of the Boeing Airplane Company, was in charge of the survey.

WITH four new organizations taking to the air during the month, five private flying clubs are in operation in Oakland. The clubs, organized on a non-profit basis, include the Oakland Flying Club, United Flying Club, East Bay Flying Club, Rainbow Flying Club and the Oakland Police Aero Club. The Oakland police club was formed by five members of the Oakland police department. A Barling low-wing monoplane has been purchased for training purposes.

THROUGH an agreement with the port commission, a regular bus transportation service is now being operated between the Oakland Municipal Airport and all points in Oakland and Alameda. The service, which connects with all regularly scheduled air transport planes, is operated by the Oakland Airport Transportation Service.

AN agreement whereby the Pacific Coast chain of upper air weather reporting stations will maintain its headquarters at the Oakland Municipal Airport for the next five years has been signed with the port commission. Under the agreement, the weather bureau is furnished free quarters, in return for supplying fliers with weather information.

PREPARATIONS for the launching of the summer aerial patrol of the forests of northern California are being made at the Oakland Municipal Airport following the award of the contract to the Pacific Coast Air Service. This is the second year that the contract has been awarded to the Oakland organization. The patrol is scheduled to start June 1.

OPERATED by the James McDermott Post of the American Legion, the 160-acre airport at Tracy, has been developed into an all-way landing field. Two hangars have been constructed, and work is now under way on the installation of lighting equipment. The land was purchased by the city and leased to the Legion post.

CONSTRUCTION of a fifth hangar to be leased to the Boeing Air Transport has been begun at the Oakland Municipal airport. The structure will measure 120 by 300 feet and will be of all-steel construction.

A REQUEST that the Oakland Municipal Airport postal sub-station be made a classified station has been filed with the Postmaster General by William Nat Friend, Oakland postmaster. Operating under the higher class, it could be used as a "last resort" mailing station by persons desiring to place mail on outgoing mail planes after the closing time at downtown stations.

WITH the doubling of the transcontinental service, the staff at the Boeing Air Transport base at Oakland Municipal Airport has been increased to 27 persons. The staff is under the direction of O. C. Richerson, field manager.

THE first application for a Federal license for a glider on record at the Oakland Municipal Airport has been made by George C. Wilber.

AN air transport service between Oakland Municipal Airport, Mills Field, San Franacisco, and the Monterey Bay recreation area, 100 miles south, has been opened by Maj. Livington Irving Aviation Activities of Oakland. For the present, service will be confined to week ends, but daily service will be maintained during the summer months, according to Maj. Irving, head of the company.

THE number of planes operating from the Oakland Municipal Airport was increased to 70 with the inauguration of commercial flying services by E. J. Myers and Walter J. Browne.

ORGANIZATION of the Western American Aero Corporation, western representative of the Pyle-National Company of Chicago, and the leasing of space in Hangar No. 3 at the Oakland Municipal Airport were announced May 7 by Charles L. Henck. The concern will specialize in airport, airway and airplane lighting equipment.

AT the request of operators, reduction of Oakland Municipal airport charges on certain types of planes has been granted by the port commission. Planes of less than 700 square feet will pay a monthly hangar rental of $35 instead of $40. Waco, Golden Eagle, Pinto and Moncoupe planes come under this class. Commercial charges for single-seater planes was fixed at $37.50 per month during summer and $22.50 during winter. Daily rates for transient planes which operate commercially was set at $20 in summer, and $10 in winter.

ESTABLISHMENT of a Los Angeles branch of the Western Aviation Supply Company of California, through the purchase of the Wheeler-Halm Company of that city, was announced recently by Burton Ames, general manager. The southern branch is the first of a series of branches planned throughout the state by the Western Aviation organization.

FEATURING a race for women fliers only, the first annual northern California section of the Society of Automotive Engineers' flying circus was recently held at the Oakland Municipal Airport. The aerial program was sponsored by the Oakland chapter of the National Aeronautic Association. A 5.2-mile course marked by pylons was laid out for the races. The official timers were headed by Leo S. Nagle, president of the Oakland N. A. A. chapter, and Joseph Long, chairman of the arrangements committee for the engineers' organization.

Prizes totalling more than $4,000 were awarded to the winners of the five events.

ALAMEDA

[HOWARD V. WALDORF]

ADDITIONAL contracts, which will increase the landing area of the Alameda airport to 300 acres, have been awarded by officials of the flying field.

MADELYN KELLY, girl flier, has been appointed official hostess of the Alameda airport. Her duties are to greet visitors to the flying field, and in case of the arrival of distinguished guests by airplane, to fly out and escort them to the landing field.

SEVENTY-SIX students are enrolled in the flying school conducted by the Royle Air Lines at the Alameda airport.

(*Continued on next page*)

Flight Training
on Lindbergh Field

The system of training which has made America's military pilots supreme in the air is now available to civilian students at *Airtech Training School.*

In conformity with the military practice of employing only the best type of standardized equipment, of carefully selecting the personnel and of insisting upon thorough exactness in all instruction, the operating policies of *Airtech Training School* have been adopted. These policies have dictated the use of modern radial air-cooled engines, standardization on the best available training planes and the use of parachutes for all *Airtech* training activities.

The flight training curriculum is divided into three stages; Primary, Intermediate and Advanced. For each of these stages a definite training routine has been developed. This carefully executed system of flight training assures that *Airtech* graduates are thoroughly competent to meet the exacting demands of modern commercial aviation.

You will enjoy reading our new catalog "Flight Facts from Lindbergh Field," giving complete information about the Technical and Flight Training Divisions of *Airtech Training School.* The coupon is for your convenience. Mail it today.

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Please send me *"Flight Facts from Lindbergh Field."*

Name Address

(Alameda News continued)

RESTRICTED to fliers who have landed their craft safely after the engine has broken loose in the air, the Hellcat Club has been formed at the Alameda airport. Charter members include Vance Breese, San Francisco; Dillard Hamilton, Department of Commerce aeronautic inspector; and Jerry Andrews, Alameda airport pilot.

APPROVED by the voters of Alameda, preparations are being made to establish a 211-acre air terminal on the western Alameda waterfront. The air terminal is the project of the San Francisco Bay Airdrome, Inc., of which James Talbot, of the Richfield Oil Company and the Fokker company, is president. Negotiations are now being made with the University of California, owner of the property, for a 20-year lease of land. The site is less than a mile from the center of Oakland, and is convenient to the San Francisco ferry. It adjoins the proposed site of the Pacific Coast Army air base, and is approximately a mile east of the Alameda airport.

CENTRAL CALIFORNIA

[RUSSELL GRIGSBY]

STOCKTON'S municipal airport now has three 1,000-watt General Electric floodlights, mounted on eight-foot iron standards, and located on the south side of the field. These light standards are in a line, painted with black and yellow stripes. The runway and approaches have been lengthened, rolled, and oiled. The reservoir in the northeast corner has been removed. A submerged gas, air, and water pump has been installed. The entire field is now in excellent condition.

Henry Nordwick, a licensed airplane and engine mechanic, is now employed at the field all the time. Henry is an expert machinist, and according to reports, was the first to design, patent, and build a cam motor.

LES AND ED ORANGES have bought a Whirlwind Travel Air from the Pacific Air Transport. On the day that Les arrived with it from Oakland, quite a crowd turned out to see him come in. A prize English bulldog of Mrs. Oranges jumped up to bite the propeller, and got its head chopped off.

OAKDALE has obtained title to an 80-acre field, one-half mile south of town, and will commence improving it immediately.

THE American Legion of Tracy put on a three-day air circus in April, which netted them $4,608. This money will be used for further improvements at the field.

Bill De Vries, now manager of Tracy Airport, has received a new Eaglerock. He has a large class of students.

A NEW private airport is under construction on the Beard Tract, two miles southeast of Modesto. Payment has already been made on 80 acres, and an option has been obtained on 80 acres adjoining. Carl Seagrave, Jr., who has charge of development work, has announced that the field will be dedicated on June 4. A big celebration is planned, and the Northern California Air Tour will arrive on that day.

About $10,000 will be spent leveling, grading, and oiling three parallel runways east and west, one-half mile long, and one diagonal runway three-quarters of a mile long, and one 1,000-foot runway north and south. Plans call for a 6-plane hangar, oil, gas, water and rest rooms.

At the April city election, the proposition to move the municipal airport was defeated. The old fair buildings have been torn down, a new runway has been built, and the hangar will be moved several hundred feet farther east. Only licensed pilots are allowed to fly off the field.

SACRAMENTO

[RALPH K. CLARK]

A PROJECT calling for a three and a half million dollar flying field for Sacramento, built by private capital, is being financed and supervised by C. E. Wright, pioneer Sacramento realtor. Grading and leveling of the field has been under way since January 1. No public announcement of the work has been made by Wright, who has consistently refused to make statements to the press relative to the purpose of the field which he is grading. Wright has, however, announced at meetings of the Sacramento Aviation Club, chapter of the National Aeronautic Association, that he was developing an airport on his property. He has also had conferences with the Boeing Air Transport officials.

Wright owns the property upon which the field is being developed. It consists of 200 acres, located on the edge of the city limits and five miles from the heart of the business district. Wright has already purchased over $25,000 worth of grading equipment, which includes three Caterpillar tractors, numerous fresnos and graders, horses and other equipment. Five good sized sheds and stables have been erected on the property to house the equipment, and construction of a number more will be started soon.

MATHER FIELD recently resumed something of its war-time bustle following the arrival of the Ninety-first Army Observation Squadron and the Fifteenth Photograph Section from Crissey Field, San Francisco, for the annual machine gun and bombing practice.

The squadron was commanded by Lieut. Colonel Gerald C. Brant and was composed of eighteen officers and seventy-five enlisted men.

WORK on the installation of the night lighting equipment for Mather Field was undertaken recently. When the installation is completed, the field will be equipped with a high power beacon light, floodlights and border lights. This will enable planes to land safely at Mather at night.

ARIZONA

[HAROLD G. WILSON]

EIGHT thousand dollars of Federal funds for the improvement of the Tucson municipal airport will be made available July 1, 1930. This will be used for the construction of an operations office to house the radio and meteorological stations, now in temporary quarters, and to complete the Government hangar by adding doors and a cement floor. The personnel dormitory, constructed at a cost of $4,400, was completed in May and occupied by the five men stationed there to run the two stations. It is the second Government building on the field.

TWENTY-ONE planes from Rockwell Field, San Diego, landed at the municipal field, Tucson, May 10, en route to the maneuvers in Ohio the latter part of the month. Maj. Carl Spatz, commander of the *Question Mark* flight, was in command.

A TEN-YEAR lease has been taken on the Chandler airport by the Arizona Flying Service, of which Glen W. Brophy is president. Plans are under way for the construction of a hangar, administration building, and a refreshment building on the tract, as well as for further improvement of the field itself, including night lighting. E. A. Felts, formerly with the Southwest Cotton Company, has been named airport manager. The company plans to use this field as its training school and also for an assembling plant.

A LEASE on a tract of land at Kingman, in the northern part of the state, has been taken by the Western Air Express, which is preparing to open its line from Los Angeles to Kansas City. Robert O. Boykin, field engineer for the company, made the selection of the tract. Kingman will be a division point on the line. Hangars, administration building and shops are to be erected there.

AN air-rail hookup between the Rock Island and Maddux Air Lines, Inc., is being planned. The plans call for picking up westbound passengers from the Golden State Limited at El Paso and putting them in Los Angeles that night, saving 12 to 14 hours. A similar saving would be effected on the eastward trip. Tentative stops in Arizona are at Phoenix and Tucson. Maddux Air Lines already operate as far eastward as Phoenix, in addition to their coast lines.

PLANS are being made for the dedication of the Florence, Ariz., airport in the near future, although no date has been definitely set. Planes have been promised from the Scenic Airways, Phoenix; Arizona Flying Service, Phoenix; O'Donnell School of Flying, Long Beach, Calif.; San Diego and Tucson. The field is 2,330 feet long by 1,500 feet wide, and is located three miles south of town on the Tucson-Florence highway. Border lights are being installed and markers placed. The improvements are

(Continued on next page)

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RYAN at SAN DIEGO CALIFORNIA
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AVIATION SCHOOL

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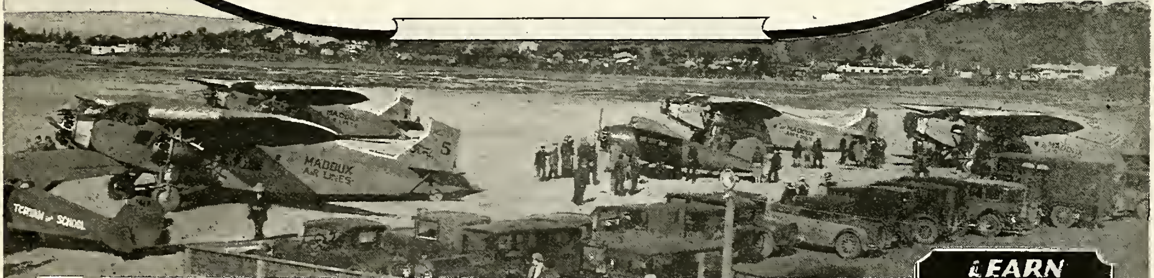
You, too, will appreciate the higher RYAN standards while training and the value of the RYAN SCHOOL reputation after graduation. RYAN training is *thorough* and includes the greatest possible variety of aeronautical experience. Equipment for advanced training includes eight different types of licensed monoplanes and biplanes, both open and closed, large and small.

RYAN students pilot their ships on cross-country trips over mountains, deserts and ocean; receiving the *complete* training which is possible only in the glorious state of California.

The daily ground school occupies four hourly periods each afternoon. Definite schedules of a well planned curriculum include the course in aerial navigation by Lt. W. V. Davis, U. S. N., member of the famous naval Sea Hawks and navigator for Art Goebel on his winning Dole Flight.

RYAN airport, as the hub for one of the country's largest air systems, also gives RYAN students daily contact with huge passenger planes arriving and departing on daily schedules. Aeronautical contacts are readily established here, for San Diego is the center of the world's greatest flying activity!

NOTE: All training is given under the personal supervision of T. Cloude Ryon, original designer and builder of Ryan monoplanes and founder of Ryon Airlines, Ryon Flying Company, T. C. Ryon Flying School and T. C. Ryan Aeronautical Corporation.



This school invites the attention of those who are interested only in the highest standards of aeronautical training. RYAN TRAINING costs more than ordinary training . . . It is worth it! Courses include:

The Transport Course ....210 flying hours
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(*Arizona News continued*)

being made under the joint supervision of committees of the city council and chamber of commerce of Florence.

THE Phoenix Junior College is offering a course in aviation which will include training in actual flying, according to an announcement made by Dean H. A. Cross. Equipment of Standard Airlines and of the Van Buren airport will be used. Credits from this school will be accepted at Government air schools. The course is designed chiefly to give students an opportunity to find out their aptitude for aviation, without having to enroll in a regular flying school. Providing the vocation is one they wish to follow, they will have been given a good basic education for continuing the study.

THE Nogales airport was put in excellent condition by troopers from the 25th Infantry and the 20th Infantry, for use of Government and other fliers during the concentration of troops there for the Mexican revolution.

A 160-acre tract of land for use as an airport has been leased by the Bowie Chamber of Commerce. It is already level and will need but a small amount of smoothing to make it a practical field.

AN aviation club has been formed among the students of Phoenix High School.

A REQUEST has been made to the War Department to assign a squadron of planes to the Arizona National Guard, for use in training for its members. The request was made in Washington, D. C., by Brig. Gen. Joseph F. Pomeroy, adjutant general of the state.

A TRACT of Government land, four and a half miles north of Tombstone, is being improved as an airport. This tract was declared best of three under consideration, being favored by Major Lohman, commander of the air fleet at Fort Huachuca during the Mexican rebellion. The work is being done by the county engineering department.

ELEVEN students have been soloed by the Aero Corporation of Arizona since April 1, and there are now 77 students taking training in the corporation's school.

AN operations building, costing $5,000 will be erected at Fly Field, Yuma, the latter part of 1930. The radio and meteorology stations, installed by the Government, have just been completed and are now being used to give regular data to fliers along the southwest airways.

THE thirst for adventure and gold, which lured many a Yankee flier across the international border and into the employ of the rebels engaged in revolting against the Mexican government, has ended in only an interesting experience for most of them. Many of them now face charges of conspiracy for transporting wartime munitions across the border, their planes being interpreted as such. When the rebels were backed to the border during the last days of the revolution, the fliers (like many a Mexican general) just stepped across the line. But most of them stepped into the waiting hands of Government authorities who arrested them on Federal charges.

NORTHWEST

[F. K. HASKELL]

FOR the Medford division between the Oregon state line and Drain, Oregon, the sites for beacon lights on the night air mail route are: Barron emergency field at the foot of Siskiyous, Dunns Butte, Valleyview, Medford Airport, Gold Hill, Grants Pass, Sexton Mountain, Greave Creek, Wolf Creek, Stage Coach Pass, Cow Creek Field, John's ranch, Canyon Mountain, Mississouri bottoms near Riddle, Weaver Hill near Myrtle Creek, Nebo Mountain near Roseburg, Roseburg air field, Wilbur, Sutherlin, Rice Hill, Oakland, Yoncalla and Drain.

The northern California sites are: Delta, Lamoine, Glume Creek, Dunsmuir, Shasta, Weed Airport, Gazelle, Montague, Hornbrook, Siskiyou, Yreka and Steinman. Seven beacons burning gasoline will be installed at isolated points.

W. L. STEPHENSON has been named Portland representative for Mamer Air Transportation Company, operating the new Portland, Yakima-Spokane line. Offices have been opened in the hangar of the MacKenzie-Morrow Aviation Company.

NIGHT air mail service between Pasco and Salt Lake City will be inaugurated June 1 by the Varney Air Lines.

THE airport at Goldendale, Washington, was recently dedicated. Airplane races and stunts featured the program. The twenty-mile race was won by Don Phillips of Seattle. Tex Rankin of Portland was second. Rankin won the dead stick landing contest, and was first in flying stunts, with Phillips second.

FOR the first time in the Northwest, a railroad reconnaisance has been made by airplane. P. E. Thain, the Northern Pacific construction engineer in charge of locating the Aloha-Hoh River branch through western Grays Harbor and Jefferson counties, recently took four Hoquiam and Aberdeen Chamber of Commerce representatives on an inspection flight over the territory.

SEVERAL airplanes from Boeing Field, Seattle, flew to Grand Forks, B. C., on May 9 for opening ceremonies of the first government licensed airport in interior British Columbia. R. H. Pooley, acting premier, Maj. D. R. McLaren, L. A. Dobbin, and other prominent Canadian airmen took part in the proceedings.

WILLIAM AND GEORGE HALLET have started an aeronautic school at the new municipal air field at Kennewick, Washington.

THE Boeing System recently celebrated the completion of 5,000,000 miles of air mail flying. Postmaster John M. Jones of Portland assisted in the celebration by personally transferring the San Francisco mail, brought in by Pilot Grover Tyler, to the Seattle plane piloted by Russ Cunningham. Mayor Baker, other city officials, and a throng of spectators were on the Portland field for the event.

In anticipation of the new double air mail schedule, the Boeing Airplane Company, Seattle, recently completed building a fleet of 25 high-speed planes, each capable of carrying 60,000 letters at 142 miles an hour.

A RED King Salmon weighing thirty-four pounds, displayed recently by the San Juan Fishing and Packing Company, represents the first shipment of fresh salmon to come out of Alaska by airplane. The fish was sent to the local firm by the Juneau Cold Storage Company on the plane *Juneau*, which flew from Alaska to Seattle in one day.

AS soon as the Medford airport is ready for building, the Pacific Air Transport will start construction of a $5,000 administration building, according to an announcement made by Seely V. Hall, superintendent of the Medford division of the airline.

The new building will consist of division offices, waiting rooms, and depot offices, and will conform architecturally with the administration building to be erected by the city.

THE airport commission of Roseburg, Oregon, has ordered a survey of the 140-acre tract which is being held under option for purchase for aviation purposes. The Umpqua Post of the American Legion holds the option on the tract, which the city will take over as soon as the legal transfers can be made.

PORTLAND aviators have been invited by Ben H. Malkson of Redmond to participate in Central Oregon's first air circus, scheduled for the first of June in connection with the dedication of that city's airport. Redmond's field, developed by the Ray Johnson Post No. 44, American Legion, and the Redmond Chamber of Commerce, is two miles east of town and has a runway 1,300 feet long.

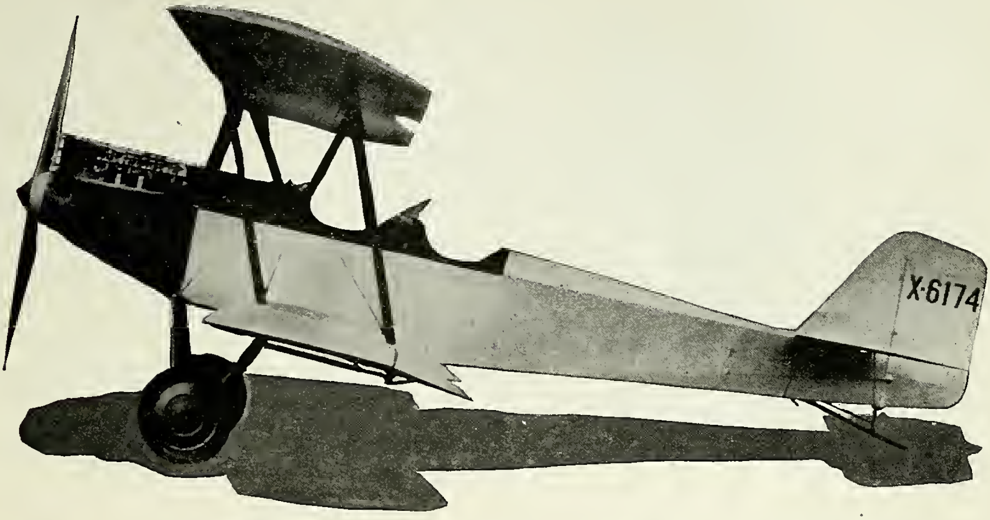
EDWARD J. GREER has accepted a position as pilot with the Boeing Air Transport, Inc., and is located at Salt Lake City. Mr. Greer is a graduate of Brooks Field, Texas, and was formerly chief instructor in the Greer Aeronautical School at the Oakland, Calif., municipal airport.

NEVADA

[GLEN PERRINS]

W. C. HALLIDAY and K. H. Turner, of the Seagull Airlines, recently visited Ely, Nevada, with the purpose of inquiring into the feasibility of establishing an air mail route between Ely and Salt Lake as a close hookup with the transcontinental line.

...Imitation Is A Concession To Superiority



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The first real step toward the realization of commercial aviation in the United States was the development of the three-place biplane and it is noteworthy that the first plane of this type bore the name "SWALLOW." The greatest testimonial to this first Swallow's commercial supremacy was the almost immediate formation of other concerns for the express purpose of attempting to build a similar airplane.

At the present, years after Swallow's first contribution to Aviation, this same organization, with the same thoroughness and integrity of purpose, has again offered a new type airplane—an airplane that has been painstakingly designed to fulfill a great need—a plane that is again destined to create an upheaval in the aviation market. This plane is the SWALLOW T. P. and again the Swallow organization anticipates the subtle flattery of imitation.

The point we wish to emphasize, however, is: Although Swallow's lead may be followed and its general design imitated, SWALLOW QUALITY — SWALLOW AERODYNAMIC SUPERIORITY and SWALLOW VALUE are to be had only in SWALLOW airplanes.

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OREGON

[C. K. Logan]

FURTHER reorganization of Salem flying activities has been effected with the $100,000 incorporation of the Eyerly Air Transport Company, formerly the Eyerly School of Aeronautics. Lee Inman is vice president, and C. J. (Bud) Jenson, secretary-treasurer. Manufacture of the cabin monoplane designed by Eyerly will proceed as soon as a site on or near the municipal airport is available. Ground and flying instruction and commercial work will be continued.

ANNOUNCEMENT of the appointment of George E. Love, chairman of the national committee of aeronautics for the American Legion, as special sales representative is announced by the Breese Aircraft Corporation. Mr. Love served in the air service overseas during the war.

IF efforts of the Eugene Chamber of Commerce are successful, the air mail planes will stop in Eugene every morning about 8 o'clock. Southbound ships leave Portland at 7 a. m., arriving in San Francisco at 1:15 p. m.

ARTICLES of incorporation have been filed by the Eckerson Flying Service, Springfield. Capitalization is $15,000. Incorporators are James C. Stovall, Mary Douglas Stovall, and Gilbert H. Eckerson.

WASHINGTON

[C. M. Littlejohn]

CAPITALIZED at a quarter million dollars, the Alaska-Washington Airways have been incorporated at Seattle. J. L. Carman, Jr., and John Ambler are the organizers of this enterprise. The company's planes will fly from Seattle to Juneau, Alaska.

WALLA WALLA expects to equip itself with a fine new airport at an early date. A special election to decide on an issue of $30,000 of bonds for this purpose is to be held June 18 in that city.

NEW regulations are being formulated for the municipal airport of Seattle. R. R. Montell, consulting engineer, has turned over to the board of county commissioners, who control the airport, recommendations that all planes in the Army, Navy, and mail service be given preference and right of way in the use of the field, and that a range of charges for the use of the hangar be based on wingspread. Minimum rental rates for transport companies were also embodied in the recommendations.

A $5,000,000 development of the Sand Point aviation base at Seattle is in prospect with the first million authorized for immediate improvement of the Naval air base at Sand Point, just northeast of Seattle. Lieut. Commander John Dale Price, commandant, and Lieut. C. W. Coryell, U. S. N., are in charge of the development plans to enlarge and improve the air base to accommodate thirty squadrons of sea and landplanes.

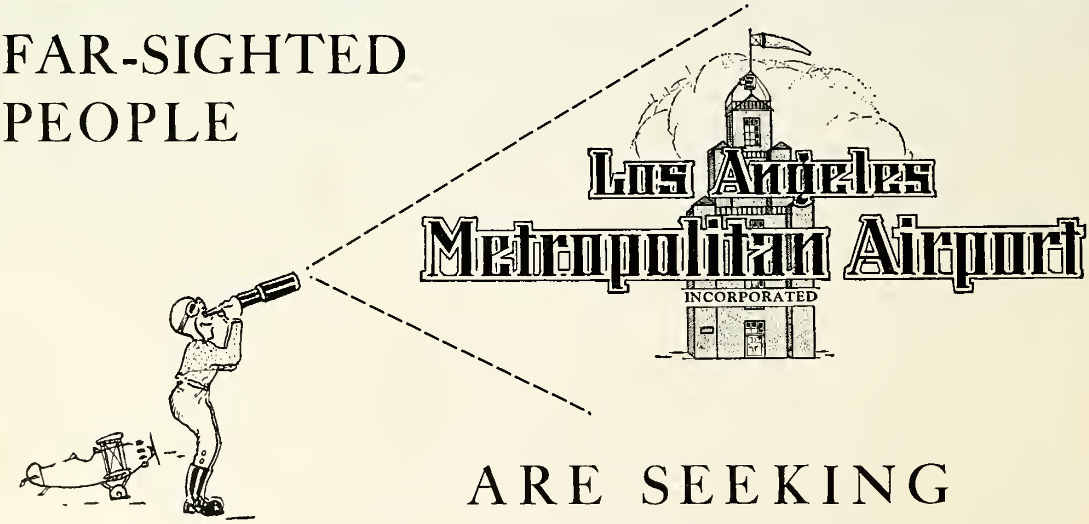
AN airport and aviation inspection trip of Europe is to be made by C. L. Egtvedt, first vice president and general manager of the Boeing Airplane Company of Seattle, together with George J. Mead, vice president of the Pratt and Whitney Aircraft Company, Hartford, Conn.

JACK SCOTT is to have charge of a modern commercial airport which is being prepared north of Bellingham, Wash., for the use of that city.

DURING the month of May, a flying good-will caravan of Seattle businessmen toured Washington and visited twenty-six cities of the state. A dozen planes were in the air caravan.

IN the scheme of development of the municipal air field at Seattle, a first unit of permanent buildings has been designed by the Austin Company of Cleveland, Ohio. The plan follows the railroad terminal principle, the station having accommodations for a general waiting room, restaurant, etc., as well as air mail and express departments. Provision is also to be made for the custom and immigration officials of the

(Continued on next page)



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Miller Valve Guides and Seats put the cylinders back in service.

Miller 3 Ring, Medium High-compression Pistons, increase power.

Miller Valve Guide Jig, for replacing Guides in your own shop.

Miller Valve Seat Set, in conjunction with the Guide Jig replaces the seats.

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LADY LINDY Helmets—the latest, newest, aviation sports helmet. Hand-made, specially tailored of soft, pliable African cape glove leather, silk lined. For flying and other sports wear. Made in small, medium and large sizes. May be obtained on special order only.

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(*Washington News continued*)

Government. Offices will be provided for the field officials, radio, weather bureau, and Department of Commerce officials.

BECAUSE of ill health, O. W. Tupper, an official of four of the Boeing companies, has resigned from the Boeing enterprises. He is succeeded by D. R. Drew, of the Boeing staff. Mr. Drew was also elected to succeed Mr. Tupper as secretary of the Seattle chapter of the National Aeronautic Association.

DEVELOPMENT of the Olympia airport was the most important subject of an "air banquet" held May 10th at the Hotel Olympian of that city, which was sponsored by the Olympia chapter of the National Aeronautic Association.

THE Coast Airlines, a flying school at Seattle, has opened classes in Bremerton, Wash. The Northwest Flying Club, of Seattle, has also expanded into Ellensburg, where it is offering courses. Ben Easky of the Northwest Flying Club is stationed at Ellensburg.

BOEING Airplane Company of Seattle is planning the introduction of a sport plane for commercial sale to its line of products, according to a recent announcement of Boeing officials. It is understood the plane will be a commercial model of the ship which Captain Eaker used on the Brownsville-Panama flight. The Army model developed a top speed of 172 miles an hour and the Boeing sport plane will have a guaranteed speed of 165 miles an hour, with a landing speed of less than 50 miles an hour. A Pratt and Whitney Wasp engine will be used.

THE Mamer Flying Service plans to establish daily service between Pasco and Spokane, and between Portland and Seattle, each branch connecting with the main Salt Lake City-Boise-Portland service.

IN order to insure airport development in the state of Washington, a new measure has recently been introduced in the state legislature. It would give authority to any taxing district in the state to create an airport fund by simply levying a fifth-of-a-mill tax on property owners. The bill was introduced by Senator Williams of Spokane and Senator Metcalf of Pierce County.

THE Aviation Operators' Association of Seattle is taking action to clear Boeing Field of all but licensed planes and operators. It recently presented this decision along with four safety first proposals to the board of county commissioners, which acceded to the safety proposals.

TO aid aviators flying to and over Raymond, Wash., a large aerial signboard, measuring 87 feet in length with letters 12 feet high, has been placed on the roof of an auto company to mark the city. An arrow pointing north indicates directions.

DURING the first four months of 1929, Boeing System flew approximately 251 tons of air mail as against 96 tons for the same period for 1928, an increase of 260 per cent.

RECENT changes made in the traffic department of the Boeing System resulted in the following present organization: W. A. Patterson, general traffic manager with headquarters at Salt Lake; S. A. Stimpson, San Francisco traffic manager; K. K. Knickerbocker, Chicago traffic manager; H. W. Peterson, Omaha traffic manager; Russel Ahrens, Oakland traffic manager; Lee Jamison, Portland traffic manager; George Strehlke, Seattle traffic manager; A. J. Kinsman, Passenger traffic manager with headquarters at Salt Lake.

A HYDRAULIC press of 700-ton capacity weighing 40 tons is being used in the factory of the Boeing Airplane Company at Seattle, Washington. In thirty seconds it does work which formerly required the services of two men for two days. It is used to stamp out cowling, metal covered surfaces, flooring, metal ribs, or any form sheet metal parts.

LIEUT. HAROLD BROMLEY plans a trans-Pacific solo flight from Tacoma, Wash., to Tokio, Japan, in June, flying a Lockheed Vega plane powered by a Wright Whirlwind engine. Lieut. Bromley will follow the great circle route, skirting Alaska and the Aleutian Islands.

(*Continued on next page*)

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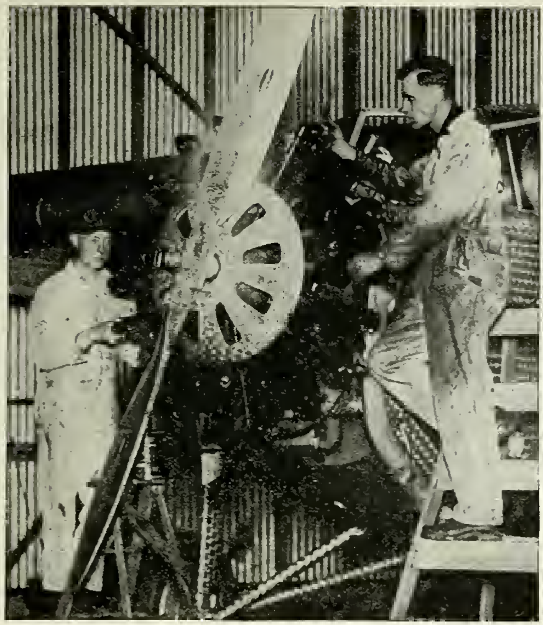

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From one dawn to the next the shops resound with activity. The departments of motor overhaul and repair, rigging, painting, and experimental development are never closed.

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The American Aeronautical Institute offers to prove to you they are right. We don't ask you to pay our regular price of $115.00 for our complete course of 60 lessons, but we do offer you 7 lessons for $10. And here is where I will tell you straight from the shoulder, if you see in the first few lessons that aviation is not for you, don't waste your time. If you do see the future we will finish the job with you at just $1.50 a lesson, making the complete course $89.00.

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AVIATION

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(Washington News continued)

THE Hoffar-Beeching Shipyards in Vancouver, B. C., have been acquired by Boeing Aircraft of Canada, Ltd., preparatory to starting an airplane factory, according to a recent announcement made by W. E. Boeing, of Seattle, chairman of the board of the Boeing Companies.

Boeing Aircraft of Canada proposes to increase the present floor space at the shipyards from 30,000 to 60,000 square feet and install machinery necessary for building airplanes. Initial production, it is expected, will start on six-seat B-1E flying boats, a type now produced by the Boeing plant at Seattle. Manufacturing activities will be expanded later to include production of land planes, and the fabrication of various types demanded by the Canadian market.

UTAH

[Glen Perrins]

WITH the inauguration of the double air mail schedule on May 1st, Salt Lake City became one of the most important air mail and air transport centers in the United States. Ships of the Boeing Air Transport, on the transcontinental route, and the Western Air Express line between Salt Lake and Los Angeles inaugurated the initial double schedule. Hundreds of people motored to the airport for the event.

SALT LAKE CITY has been chosen for the main station of the system of radiophone stations now being constructed by Boeing Air Transport.

THE installation of the automatic wind direction indicator and lighting system developed by City Commissioner Harry L. Finch and C. J. Reading, superintendent of the city fire alarm system, has been completed at the Salt Lake airport. This lighting system is turned on automatically.

BOEING AIR TRANSPORT offices at Salt Lake City were enlarged during the first part of May to include the traffic department. The bringing of the traffic office from San Francisco to Salt Lake now makes this city the general headquarters for the entire Boeing line from San Francisco to Chicago.

OGDEN AIRPORT will be lighted in the near future, according to supervisor H. R. Tripp. The airport is being graded. Border lights, runway lights, a beacon and other special fixtures are planned.

A MODEL airplane building contest is being sponsored by the Golden Eagle Aero Club of Salt Lake City.

ARRANGEMENTS have been made for an airport at Vernal, Utah, 120 miles from the nearest railroad point. Airplane service would be a means of linking this section with the outside world. The cost of the field is estimated at $25,000.

WALTER H. VARNEY, president of the Varney Air Lines, recently announced details of a passenger network that will tie in several cities of the Pacific Northwest with the transcontinental line at Salt Lake. Three trimotored Fokker planes will begin operating over the line August 1, establishing a seven and a half hour connection between Portland and Salt Lake.

IDAHO

[Ida M. Durnin]

GEORGE C. MILLER, airway extension superintendent of the Department of Commerce, has been assigned to Idaho to assist in mapping out the state's airway program. Mr. Miller laid out the lighting system for the Salt Lake-Los Angeles and Salt Lake-San Francisco routes, and was working on lighting between Portland and Pasco when assigned to Idaho.

He will assist the departments of public works and law enforcement in organizing their aviation program along the lines of legislation passed by the 1929 session of the legislature.

Thirty-one cities and towns in Idaho now have airports and landing fields, according to an anouncement made recently by Mr. Miller. These include cities and towns in all sections of the state. In Wallace, the city is so located in a canyon that an airport is not easily available. Yet aviation enthusiasts have already taken up the problem with state and Federal authorities to devise means of getting a port.

Legislation passed by the last legislature gave at least three cities—Lewiston, Pocatello and Idaho Falls—special opportunities to purchase and equip airports. The city of Lewiston will be permitted to acquire a port outside the state boundary in Washington.

Cities and towns already having ports or landing fields are Idaho Falls, Dubois, Pocatello, Burley, Twin Falls, Rupert, Caldwell, Nampa, Boise, Lewiston, Moscow, Coeur D'Alene, Kellogg, Salmon City and Spencer. In addition Government operated landing fields are maintained at Jerome, King Hill, Strevell, Mountain Home, Idahome, Emmett and Weiser, these latter being in the vicinity of the route followed by the Salt Lake-Boise-Pasco air mail route.

Airway equipment is also projected at Blackfoot, Malad, McCall, Arco, Sandpoint, Bonners Ferry, Wallace and Grangeville, according to the list announced.

IDAHO'S first state airway will be constructed from Idaho Falls eastward toward Yellowstone National Park this summer, according to J. D. Wood, state commissioner of public works. Construction of the airway depends largely upon proper municipal and county aid. Arthur C. Blomgren, state aeronautic engineer, and M. C. Hoppin, Federal airport expert, are in the eastern section of the state to start the survey for the proposed line.

The proposed line will follow that National Parks Airways line from Pocatello to Idaho Falls and will extend through Blackfoot, Rexburg, St. Anthony and Ashton. Intermediary emergency landing fields are being arranged.

THE Nampa Aviation Club was formally organized recently with 15 members. J. C. Gray was elected temporary president, and A. V. Tollinger, temporary secretary. A committee, composed of Charles Hahn, John Yoder and Mr. Tollinger was appointed to draw up by-laws.

THE steel tower for the Wendell airways beacon light has been completed. The tower is sixty feet high and is located on the high ground on the Hastings farm on the Gooding-Wendell highway.

The Wendell light is one of a chain of

(Continued on next page)

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The California Aerial Transport absolutely guarantees all of its courses. When students take a course with this organization they are given a positive guarantee that they will accomplish the object of the course which they take, regardless of the amount of time required for its completion.

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Officials of the St. Hubert Air Field, Quebec, Canada, have used a "Caterpillar" Twenty for nearly two years—building a good field and keeping it in good shape summer and winter. "Caterpillars" can help keep dust down and clear away the heaviest snow fall. There's a book about "Caterpillars" and aeroplanes. Would you like a copy?

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TEN	$1125
FIFTEEN	$1500
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(*Idaho News continued*)

beacon lights being installed by the Department of Commerce extending from Salt Lake City to Boise. The route of the lights through this section is from Jerome to Wendell, Tuttle and King Hill.

[GLEN PERRINS]

AERONAUTICAL interests from all over the West were recently in Boise for the first of two conferences to be held with a view of coördinating all airway development in the western states and unifying laws for the government of aeronautics. The meeting was termed by George Miller, Federal aeronautics advisor for Idaho, as the greatest step forward in aviation since the passage of the Federal air commerce act. Under a recently enacted Idaho state law, each community is required to build its airport in compliance with Federal and state regulations.

"The purpose of the conference," said Mr. Miller, "was to sell the surrounding states the idea of a unified system of airways, supplementary to the Department of Commerce trunk lines, which shall follow highway routes from state to state. With the start in Idaho the other states can be asked to coöperate."

No action on any of the problems affecting the industry was taken by the conference, but a long list of problems was brought up for solution at the conference which is planned next June. Taxation, reciprocity in licensing, marking of airways, unification of air routes and development of sufficient emergency landing fields, were discussed.

Interest is high over the next air meeting, to be held in Boise the latter part of June or in July.

A TOUR of all air fields of the state to examine pilots and planes applying for Federal licenses and to survey landing fields, is the task given Dillard Hamilton, of San Francisco, aeronautics inspector for the Bureau of Regulations, Department of Commerce. Planes and pilots in the state must have Federal licenses before receiving state licenses under the law passed by the last legislature.

COLORADO

[ROBERT C. CLEMINSON]

NEGOTIATIONS are under way for the location of a branch of the Curtiss Flying Service, Inc., in Denver. The company is planning to lease the Denver Union Airport, erect hangars, dormitories, install lights, and build an administration building. Curtiss will operate a flying school, sales service, and taxi line. Major C. C. Mosley is district manager.

THE dedication of the Fort Collins airport was held on May 7. A number of planes attended, four being Colorado National Guard ships from Denver, and some from Colorado Airways. The American Legion did the leveling and clearing work on the field and sponsored the ceremony.

The field lies 3 miles west of the business center of town.

CONSTRUCTION work will soon be started on the administration building at the Colorado Springs municipal airport.

THE new hangar is under construction at the Denver municipal airport. Lights will soon be installed.

THE 45th Division Air Service, Colorado National Guard, will hold its annual encampment at Fort Sill, Oklahoma, in August.

LIGHTS have been installed on the Pueblo municipal airport. They include boundary lights, obstruction lights, floodlights, and a rotating beacon.

THE Colorado State Air Board members are Major Bruce Kistler, Doctor John M. Chase of Denver, and Reginald Sinclair of Colorado Springs. They have made a number of state laws and have adopted many national laws.

CONTRACTS are soon to be let for the building of a hangar on the new Otis airport. Lights will be installed in the near future.

TALKS on commercial aviation are being given over radio station KFXF, at Denver, by Captain L. W. Goss and Harold L. Debus of Western Air Express.

HONOLULU

[VERNE HINKLEY]

THE date for the opening of Hawaii's new commercial air service has been set for September 15. At that time a Sikorsky amphibion will start operation between Honolulu and Hilo, 200 miles south and east on the island of Hawaii, under the direction of the officers of the Inter-Island Airways, Ltd.

Officials of the Hawaiian Airways, Ltd., the second company to enter the field here this year, have announced that early this fall they will place two trimotor Wasp-engined Fokkers on the run.

Both companies will carry passengers, freight and express. Neither has yet been awarded a Government air mail contract.

SPONSORS of the Western Pacific Air Transport, Ltd., with headquarters at Honolulu, have purchased two new Travel Air biplanes which they will fly from the Ala Moana airport. The port itself is to be much improved by the removal of wires and brush, by grading and by the construction of a large hangar.

The vice president and general manager of the company is Capt. James L. Giffin.

A GREAT deal of argument is being heard here over the continued existence of the territorial aeronautical commission. A member of the Hawaiian senate, now in session, introduced a bill providing for the discontinuance of the body and the transfer of its duties to the board of harbor commissioners. There has been some support for this plan and some opposition. The matter is still unsettled and doubtless will not be cleared until the adjournment time of the legislature.

D. F. C. to Lieut. Crumrine

THE Distinguished Flying Cross was presented recently to Lieut. Clarence E. Crumrine, now stationed at Wheeler Field, for his part in the Army's New York-to-Nome flight in 1920. The actual presentation was made by Major General E. B. Winans, commanding the Hawaiian division at Schofield Barracks.

LIEUT. COL. JOHN H. HOWARD, air officer of the Hawaiian department, has been ordered to return to the mainland for assignment to Mitchel Field, L. I. He will sail in September after having been three years in the islands. Maj. H. J. F. Miller, who has been the commanding officer at Wheeler Field, left on the last transport for an assignment on the east coast.

ANOTHER new law dealing with aeronautics has appeared in the lower house. It would repeal all existing aerial laws of the territory and would give the territorial aeronautical commission authority to make rules and regulations for the licensing and inspection of aircraft, pilots, aircraft equipment, provide for the suspension or revocation of licenses issued, make expenditures for administration, acquire aircraft, airports, landing fields, air navigation facilities, etc.

A GROUP of students here has organized the Hawaii Aero Club, an organization devoted to the promotion of aerial knowledge among the young men of the territory. The members plan to purchase or build a plane, under careful supervision, using the machine to train pilots from among their numbers.

THE second annual banquet of the territorial aeronautical commission was held recently at a downtown club. Among those who were guests were Governor Wallace R. Farrington, Lawrence M. Judd, who has been named as the new governor of Hawaii, Major General Fox Conner, commanding the Hawaiian department of the Army, and Rear Admiral G. R. Marvell, commanding the 14th naval district with headquarters at Pearl Harbor.

CLASSES are being conducted in the Chinese language at the Aeronautical School of Honolulu, which is operated by the Hawaiian Aeronautical Industries, Ltd. The school has recently finished its first rebuilt plane, a Hisso JN-6H, and a second plane is in the school's shop.

Most of the twenty students enrolled in the Chinese class are planning to go to China upon completion of their studies. It is believed that great opportunities in aviation will develop in that country in the future. These students have formed a club to be known as the Chinese Student Aero Club of Hawaii. The managing committee is composed of L. S. Wong, Dormant C. Chang, Francis C. Siu, Raymond C. Ng and Kam Chock Ho. Another club has been formed by the other students, to be known as the Hawaii Aero Club. The following are officers: James N. Iwamoto, Richard H. Borges, and James T. Takaki.

AMBASSADORS TO THE AIR

IN turning to the production of aircraft engines Continental Motors Corporation brings to the new field of aviation the very background which is so essential to its continued success.

Thriving and flourishing through the stern school of 28 years' experience it is today the largest exclusive manufacturer of gasoline motors in the world.

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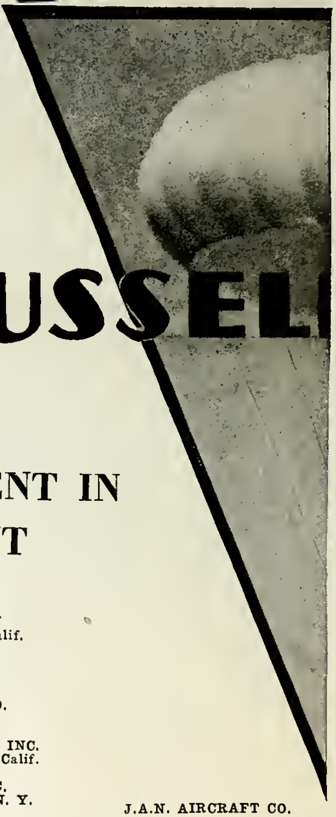

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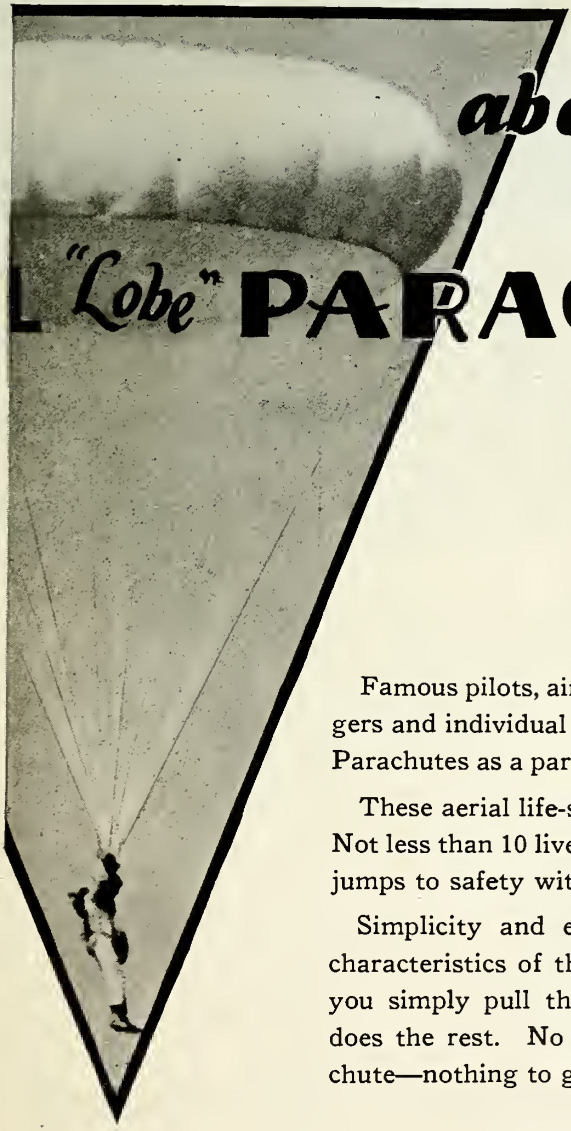

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Famous pilots, air transport companies, training schools, passengers and individual flyers the world over are using Russell "Lobe" Parachutes as a part of their regular flight equipment.

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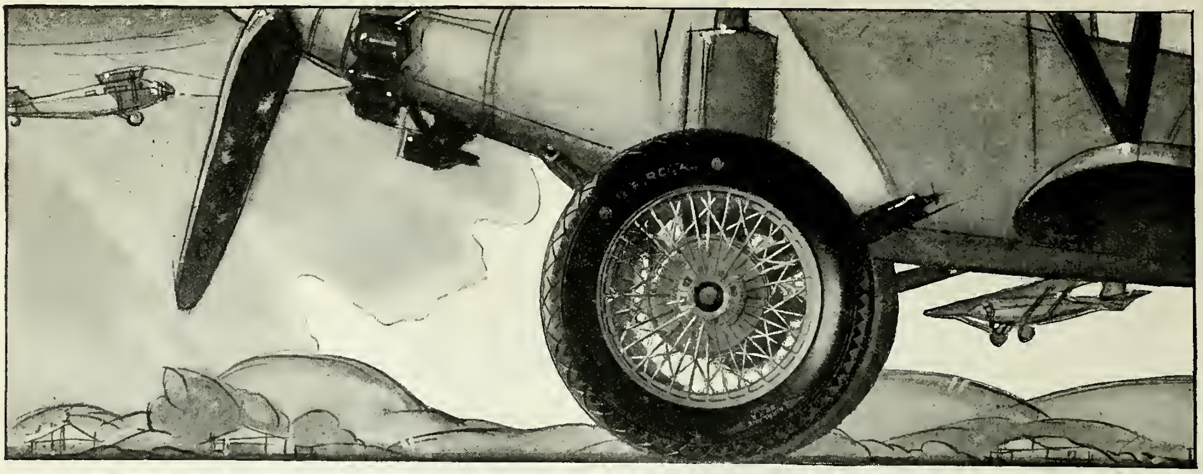

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All along the U. S. line of Rubber for Aviation you find the same initiative, the same sense of progress, the same wealth of rubber experience—all translated into the most diverse range of Rubber Specialties for all the technical requirements of Aircraft and Airport maintenance, and for the human wants of Pilot, Mechanic and Passengers.

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NAVY BALLOON WINS ELIMINATION RACE

THE three balloons which will represent the United States in the international Gordon Bennett Trophy Race for balloons to start from St. Louis on September 28 will be the Navy No. 1, Goodyear No. 7, and the Detroit *Times* balloon. These balloons placed first, second, and third respectively in the National Elimination Race which started from Pittsburgh, Pa., on May 4.

Navy No. 1, piloted by Lieut. Thomas G. W. Settle with Ensign Wilfred Bushnell as aide, landed at Charlottestown, Prince Edward Island, off the eastern Canadian coast on May 6, having traveled 900 miles in 42 hours 18 minutes, setting a new record for national elimination balloon flights. The greatest distance previously covered in these races was that flown by S. A. U. Rasmussen on July 4-5, 1927, when he traveled 570 miles in 26 hours 45 minutes.

The Goodyear No. 7, piloted by Ward T. Van Orman with Alan L. McCracken as aide, landed at Harkness, N. Y., after covering 405 miles. The Detroit *Times* entry was piloted by E. J. Hill with Arthur G. Schlosser as aide. This balloon landed near Newcomb, N. Y., having covered a distance of 380 miles, and the pilots were lost for two days in the wilds of the Adirondacks.

The remainder of the twelve balloons in the race and their flights are as follows:

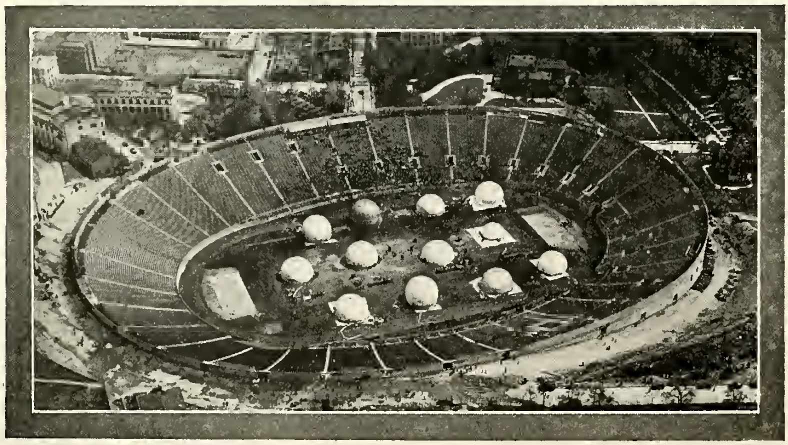
The Pittsburgher, piloted by Dr. G. M. Legallee with Walter Chambers as aide, landed at Utica, N. Y.—330 miles. Army No. 2, piloted by Capt. E. W. Hill with Lieut. Robert Heald as aide, landed at Branch, Ulster County, N. Y.—300 miles. Detroit Balloon Club balloon, piloted by S. A. U. Rasmussen with Tracey Southworth as aide, landed near Camden, N. Y.—300 miles. Army No. 3, piloted by Lieut. L. A. Lawson with Lieut. Edgar Hogelsonger as aide, landed at Rosebury, N. Y.—300 miles. St. Louis balloon, piloted by Capt. H. E. Honeywell with Roland J. Gaupel as aide, landed at Middlesex, N. Y.—225 miles. Army No. 1, piloted by Capt. W. J. Flood with Lieut. U. G. Ent as aide, landed at Ellenville, N. Y.—225 miles. Aircraft Development Corporation balloon, piloted by W. A. Klikoff with Thorvald Larson as aide, landed near Lycoming, Pa.—165 miles. American Business Club of Akron balloon, piloted by A. C. Palmer with Walter B. Griffin as aide, landed near Mt. Pleasant, Pa.—32 miles. Navy No. 2, piloted by Lieut. J. C. Richardson with Lieut. Maurice E. Bradley as aide, landed at Apollo, Pa.—27 miles.

PROPOSED AERO FLAG

AN Aviation Flag of the United States to be used on all American-owned airplanes was proposed to the House of Representatives recently by Representative Crail of Los Angeles, Calif. It will be appropriate for use on Army, Navy, Department of Commerce, and private planes.

The proposed flag will consist of a sky-blue field on which will be two gold palm branches, a large bronze-colored American eagle with wings extended, holding in its talons an airplane propeller horizontally extended, and an olive branch. On the breast of the eagle will be the American shield in red, white and blue. Below the propeller will be two stars with five points each, the one on the right being purple and the one on the left being blue. Above the eagle's head will be one white star with five points.

When the flag is extended with its length horizontal, the two gold palm branches shall have the stems crossed at the center of the bottom of the flag, blending into a wreath against the sky of blue. The eagle with its head turned to its left is above the palm branches and centered on the flag.



P. and A. Photo

Entries in the National Elimination Balloon Race preparing to take off at Pittsburgh.

GENERAL MOTORS CORP. SECURES CONTROL OF FOKKER

THE General Motors Corporation entered the aeronautical field recently when it purchased forty per cent of the common stock of the Fokker Aircraft Corporation of America, according to an announcement of James A. Talbot, chairman of the board of directors of the aircraft concern. The stock acquisition was made by the corporation as a whole and is known to constitute, as a single unit, a controlling interest in the Fokker company.

In payment for the block of Fokker stock, all of the capital stock of the Dayton-Wright Company was turned over to the Fokker company. The assets of the Dayton-Wright Company consist of McCook Field, a 300-acre airport formerly leased by the United States Government for experimental and research flying in Dayton, O., a large number of airplane patents, and a cash reserve of $6,500,000.

Harris M. Hanshue is president of the Fokker company which will be the airplane producing unit in the General Motors Corporation. Anthony H. G. Fokker will continue with the company in charge of engineering and design. The Fokker company is to have the benefit of sales and distribution for which General Motors is internationally known. The Fokker personnel is to be supplemented by additional personnel from the automobile group.

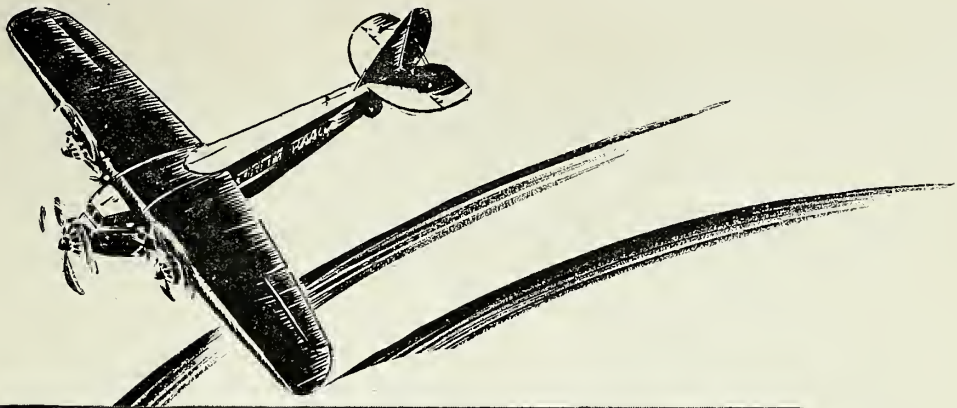
The Fokker company has three production centers at the present time. The main factory of the company is at Wheeling, W. Va. There are also plants at Passaic and Hasbrouck Heights, N. J. Western Air Express, which Mr. Hanshue developed and now heads, is not involved in the transaction.

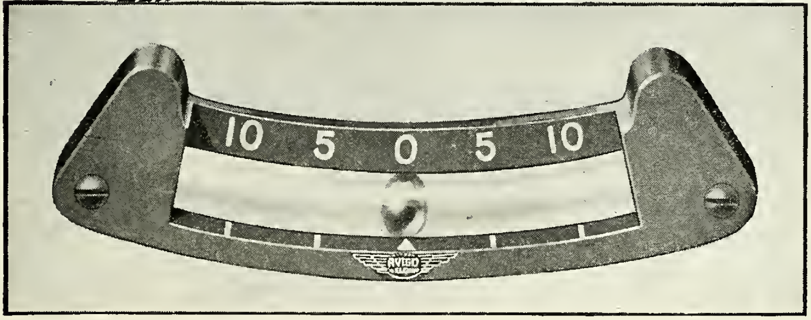
Capt. Lyon Plans World Flight

PLANS for a round the world refueling flight to be undertaken in September of this year with a backing of $500,000 was recently announced at Washington, D. C. Six fliers including Lieutenant Albert D. Hulse, former Army and air mail pilot, Captain Harry W. Lyon, Jr., navigator on the trans-Pacific flight of the *Southern Cross,* and Lieutenant L. T. O'Connell, radio officer at Lakehurst, will make the flight.

The finances for the trip are already subscribed. The route projected is from New York to Boston, thence to Nova Scotia, across the Atlantic to Glasgow, over Siberia, thence to Nome, Alaska, south to the United States and along a northern route back to New York.

The type of plane to be used was not announced, but it was described as being powered with five 420 horsepower Pratt and Whitney engines.





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AVIATION CORPORATION ACQUIRES SOUTHERN AIR TRANSPORT

By Capt. W. H. Scott

THE Aviation Corporation has acquired a controlling interest in Southern Air Transport and its six subsidiaries, according to a recent announcement. The deal was arranged by Graham Grosvenor, president of the Aviation Corp., Amon G. Carter, prominent Texas financier, and A. P. Barrett, president of Southern Air Transport.

Mr. Carter is a leading figure in Texas, being the owner of the Fort Worth *Record-Telegram*, and the Fort Worth *Star-Telegram*. He is also connected with large banking corporations and other important business activities. He is vice president and director of the Aviation Corporation. Headquarters of the Southern Air Transport will remain at Fort Worth.

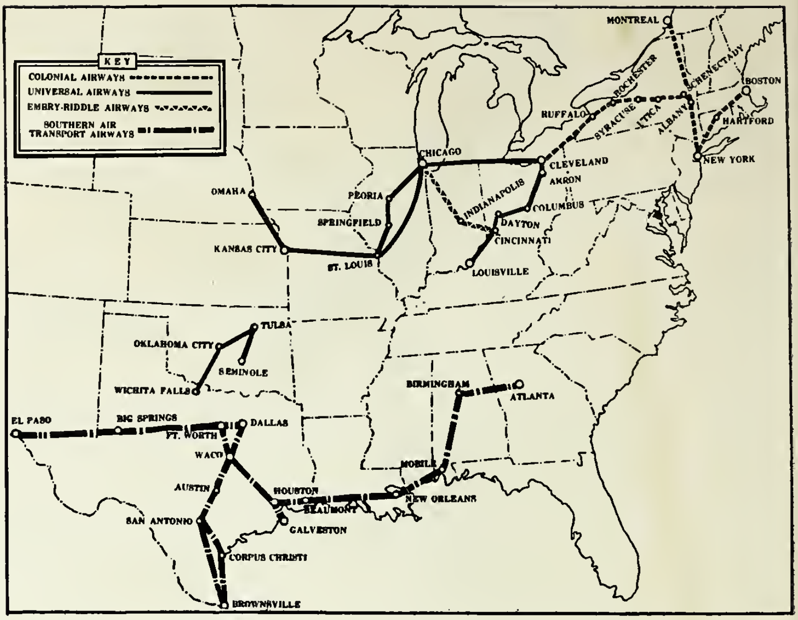
Atlanta on the east and El Paso on the west are the terminals of the airlines operated by Southern Air Transport, Inc., and its subsidiaries. The latter include Texas Air Transport, Inc.; Southern Aeromotive Service, Inc.; Texas Air Transport Flying Service, Inc.; Texas Air Transport Flying School, Inc., and the Dixie Motor Coach Corporation, of Fort Worth, and Gulf Air Lines, Inc., of New Orleans.

Texas Air Transport operates contract air mail routes No. 21, (Dallas to Galveston via Fort Worth, Waco and Houston) and No. 22, (Dallas to Brownsville, via Fort Worth, Waco, Austin and San Antonio). The Gulf Air Lines operate C. A. M. No. 29, (Houston to New Orleans, via Beaumont) and No. 23, (New Orleans to Atlanta, via Mobile and Birmingham). These air mail routes total 1,678 miles.

The development of the Southern Air Transport, Inc., under the direction of A. P. Barrett, Fort Worth, has been notable. In November, 1928, Mr. Barrett purchased the control of the Texas Air Transport, Inc., then a comparatively small company. It operated the air mail lines from Dallas and Fort Worth to Houston and Galveston, and from Dallas and Fort Worth to San Antonio and Laredo. The total daily flying schedule was less than 1,300 miles. Later Mr. Barrett formed the Southern Air Transport, Inc., a holding company which owns the control of the subsidiaries named above.

The Southern Air Transport, Inc., operates and owns Candler Field at Atlanta and the Menefee Field at New Orleans, and has recently acquired its own field at Fort Worth, the business headquarters of the company. It is the southern distributor of the Travel Air planes, Wright engines and many accessories. The company also operates the T.A.T. Flying Schools at Dallas, Fort Worth, Houston, and San Antonio. The Southern Air Transport lines have flown more than one million miles without the loss of a life or injury to any individual.

Tom Hardin, vice president and general manager of Southern Air Transport, will remain at the head of the concern. It is largely because of his efforts that the firm has made such vast headway. Jerry Marshall is in charge of the flying schools; E. G. Rhenstrom, operations manager; Robert Smith, traffic manager; C. R. Smith, treasurer; Silliman Evans, director of public relations, and Grady Barrett, vice president.



Map showing air transport lines controlled by the Aviation Corporation.

PROPOSED SOUTHERN TRANSCONTINENTAL

ESTABLISHMENT of a new transcontinental airway between Washington and Los Angeles by way of the Southern states was indorsed recently by Army, Navy and Commerce officials at a meeting with representatives of the Southern Airways Association. The proposed southern route was described as being of military importance.

Major Gen. James E. Fechet, Chief of the Army Air Corps, David S. Ingalls, Assistant Secretary of the Navy for aeronautics, and William P. MacCracken, Jr., Assistant Secretary of Commerce for aeronautics, voiced their approval of the route and urged the development of adequate airports and intermediate fields in Southern cities. The route would include Washington, Richmond, Raleigh, Columbia, Augusta, Macon, Columbus, Montgomery, Selma, Jackson, Meridian, Vicksburg, Monroe, Shreveport, Dallas, Fort Worth and Los Angeles.

The Southern Airways Association, of which J. Ralston Cargill is president, comprises representations of Southern coastal and border states from Virginia to California.

P. R. R. Air Markings

THIRTY-SIX cities and villages throughout the country have been marked for air travel by the Pennsylvania Railroad. The markings were placed on the large structures of the system in the various towns.

NATIONAL AIR TOUR PLANS PROGRESSING

THE fifth annual National Air Tour is scheduled to start from Detroit, October 5, 1929, and will return to that city October 21, according to Capt. Ray Collins, newly appointed manager of the event. The rules of the fifth annual tour will differ from former regulations.

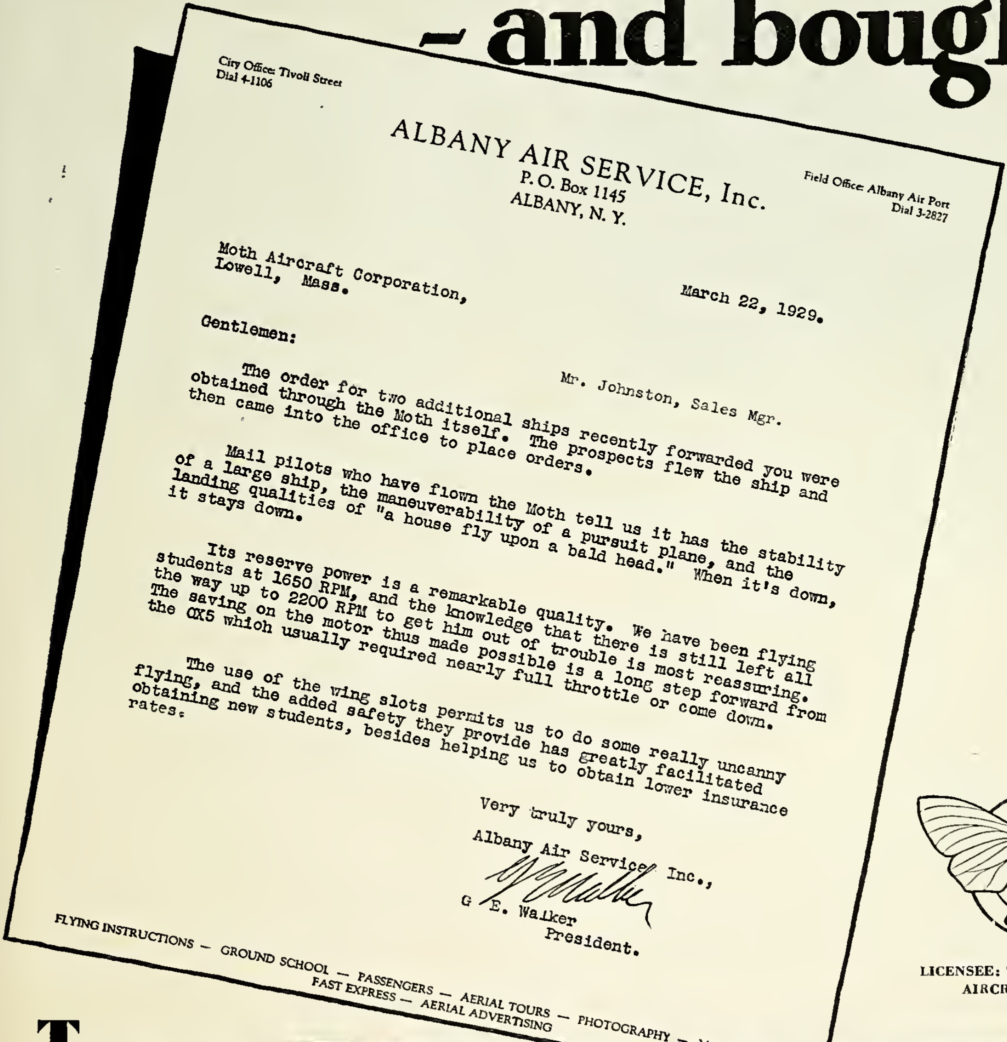
This year's tour will cover approximately 44,000 miles and the following cities are on the tentative route: Windsor, Toronto, Ottawa, Montreal, Portland, Boston, New York, Philadelphia, Baltimore, Richmond, Charlotte, Greenville, Savannah, Jacksonville, Macon, Atlanta, Nashville, Louisville, St. Louis, Kansas City, Des Moines, St. Paul, Wausau, Milwaukee, Moline, Chicago, Kalamazoo.

The importance of landing time in the tour regulations will be reduced, but consideration of take-off time will remain about as it was. There will be no billboard planes in the tour proper this year; only manufacturers' planes carrying a sign with the manufacturer's name can enter the tour. The billboard or advertising planes will be invited to go along with the tour as a second contingent.

Approved Type Certificates for entering planes must be secured at least 5 days prior to the start of the tour. Entry must be made 30 days prior to the start of tour or by September 5, 1929. Money required with entry will be refunded if the manufacturer does not receive his Approved Type Certificate in time to start. The referee must have proof of Approved Type Certificate giving specifications. Stick and unstick tests are to be made at Dearborn, the stick test to be one-half present value. No stick or unstick tests can be taken on tour. A list of passengers will be required 30 days before

(*Continued on next page*)

They *flew* the MOTH – and bought!



City Office: Tivoli Street
Dial 4-1106

ALBANY AIR SERVICE, Inc.
P. O. Box 1145
ALBANY, N. Y.

Field Office: Albany Air Port
Dial 3-2827

Moth Aircraft Corporation,
Lowell, Mass.

March 22, 1929.

Gentlemen:

Mr. Johnston, Sales Mgr.

The order for two additional ships recently forwarded you were obtained through the Moth itself. The prospects flew the ship and then came into the office to place orders.

Mail pilots who have flown the Moth tell us it has the stability of a large ship, the maneuverability of a pursuit plane, and the landing qualities of "a house fly upon a bald head." When it's down, it stays down.

Its reserve power is a remarkable quality. We have been flying students at 1650 RPM, and the knowledge that there is still left all the way up to 2200 RPM to get him out of trouble is most reassuring. The saving on the motor thus made possible is a long step forward from the OX5 which usually required nearly full throttle or come down.

The use of the wing slots permits us to do some really uncanny flying, and the added safety they provide has greatly facilitated obtaining new students, besides helping us to obtain lower insurance rates.

Very truly yours,

Albany Air Service, Inc.,

G. E. Walker
President.

FLYING INSTRUCTIONS — GROUND SCHOOL — PASSENGERS — AERIAL TOURS — PHOTOGRAPHY — MAP MAKING
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THE Moth with Gipsy engine offers an unusually profitable sales franchise to qualified dealers. Write or wire for full information at once. While over 50% of original production scheduled for 1929 is already sold, increased production will permit taking care of all new distributors with planes.

MOTH AIRCRAFT CORPORATION, Lowell, Mass.

(Continued from preceding page)

the start of the tour and all substitutions must be made 5 days prior to the start.

No work will be allowed on planes at night on the night stops, all ships being placed under guard. However, each pilot will be allowed to service his plane two hours prior to the start each morning. If because of accident or other cause it is necessary for the contestant to work on his plane longer than two hours prior to the scheduled time of departure, he shall lose all points on the succeeding lap.

Rinehart's Duration Flight

IN the April issue of AERO DIGEST reference was made on page 270 to a duration flight by Jimmie Rinehart as "unofficially recorded." By this the author had in mind unofficially recorded as far as the flight records of the F. A. I. are concerned. The flight was observed officially by a representative of the National Aeronautic Association and the performance is filed under their Miscellaneous Records in Washington, D. C. The correct endurance time was 16 hours, 18 minutes and 50 seconds.

RECENT APPROVED TYPE CERTIFICATES

AIRPLANES

Airplanes listed below have received Approved Type Certificates subsequent to those listed in the February, 1929, issue of AERO DIGEST, and are supplementary thereto:

Key: P—place; O—open; C—closed; L—landplane; Am—amphibian; Conv—convertible; Fb—flying boat; B—biplane; M—monoplane.

ATC NO.		Weight Empty	Useful Load	Gross Weight
97	Kreider-Reisner C3, 3 POLB (Warner 110)	1165	835	2000
98	Buhl, CA8A, 8 PCLB (Wright 525)	3542	2558	6100
99	Buhl, CA8B, 8 PCLB (P&W 525)	3542	2558	6100
100	Travel Air 6000, 6 PCLM (Wright 220)	2430	1670	4100
101	Brunner-Winkle A, 3 POLB (Curtiss 90)	1319	831	2150
102	Lockheed Air Express, 5 PCLM (P&W 450)	2533	1842	4375
103	Curtiss Falcon, 1 POLB (Liberty 400)	3179	1931	5110
104	Mahoney-Ryan B3, 6 PCLM (Wright 220)	2114	1590	3704
105	Swallow TP, 2 POLB (Curtiss 90)	1283	542	1825
106	Boeing 95, 1 POLB (P&W 525)	3196	2644	5840
107	New Standard D24, 5 POLB (Hispano 180)	2066	1334	3400
108	New Standard D25, 5 POLB (Wright 220)	2010	1390	3400
109	New Standard D26, 3 POLB (Wright 220)	2010	1390	3400
110	New Standard D27, 1 POLB (Wright 220)	2010	1390	3400
111	Travel Air SC2000, 3 POLB (Curtiss 160)	1659	941	2600
112	Travel Air W4000, 3 POLB (Warner 110)	1370	906	2276
113	Mono-Aircraft Monocoupe 113, 2 PCLM (Velie 55)	848	502	1350
114	Bach 3CT6, 10 PLCM (P&W 525 and 2 Comet 130)	4739	3261	8000
115	Arrow Sport, 2 POLB (Le Blond 65)	811	459	1270
116	Travel Air A6000A, 6 PCLM (P&W 450)	3225	2025	5250
117	General Aristocrat 102A, 3 PCLM (Warner 110)	1327	783	2110
118	Command-Aire 3C3A, 3 POLB (Warner 110)	1282	865	2147
119	Wallace Touroplane B, 3 PCLM (Kinner 90)	1320	780	2100
120	Command-Aire 3C3B, 3 POLB (Siemens 105)	1320	808	2128
121	Aeromarine-Klemm L25A, 3 POLM (Salmson 40)	815	510	1325
122	Fleet 1, 2 POLB (Warner 110)	976	554	1530
123	Advance Waco, 3 POLB (Wright 220)	1787	813	2600
124	American Eagle A129, 3 POLB (Kinner 90)	1220	800	2020
125	Swallow, F28AX, 3 POLB (Axelson 115)	1574	923	2497
126	Sikorsky S38B, 10 PCAMB (2 P&W 450)	6268	4212	10480
127	Stearman M2, 1 POLB (Wright 525)	3442	2136	5578
128	Buhl CA6, PCLB (Wright 300)	2478	1722	4200
129	Bellanca CH300, 6 PCLM (Wright 300)	2253	1797	4050
130	Travel Air B6000, 6 PCLM (Wright 300)	2608	1622	4230
131	Fleet 2, 2 POLB (Kinner 90)	1022	560	1582
132	Stout 4ATE, 14 PCLM (3 Wright 300)	6696	3434	10130
133	Boeing 100, 1 POLB (P&W 450)	1805	895	2700
134	Bourdon B2, 3 POLB (Siemens 105)	1142	808	1950
135	Butler Black Hawk, 3 POLB (Wright 220)	1885	1015	2900
136	Stinson SM1F, 6 PCLM (Wright 300)	2616	1684	4300
137	Stearman C3MB, 1 POLB (Wright 220)	1895	935	2830
138	Star Cavalier, 2 POLM (Velie 55)	862	538	1400
139	Alexander A12, 3 POLB (Comet 130)	1627	953	2580

AIRCRAFT ENGINES

Engines listed below have received Approved Type Certificates subsequent to those listed in February 1929, issue of AERO DIGEST and are supplementary thereto:

Key; Numerals—number of cylinders; R—radial (arrangement); V—vee (arrangement); A—air-cooled; W—water-cooled; L—in line.

ATC No.			Rated h. p.	at r. p. m.
16	Axelson Machine Co.	7 RA	115	1800
17	Wright Cyclone	R-1750-A..9 RA	525	1900
18	Packard	3A-1500 direct..12 VW	525	2100
19	Packard	3A-2500 direct..12 VW	800	2000
20	LeBlond	90, 7 RA	90	1975
21	Wright	R975, 9 RA	300	2000
22	Arnold Harris	8 VW	90	1400
23	Wright	R-540, 5 RA	165	2000

AIRCRAFT PROPELLERS

The following is a complete list of propellers having Approved Type Certificates with Certificate number, manufacturer, model designation, diameter, pitch, horsepower and revolutions per minute.

1	Standard Steel No. 1609	8.5 ft. adjustable	100	1800
2	Paragon Monoid	3.66 ft. by 5.45 ft.	100	1600
3	Hamilton H-1207	9 ft. adjustable	330	2000
4	Hamilton H-1407	9.83 ft. adjustable	500	2000
5	Hamilton H-1409	10.08 ft. adjustable	490	2000
6	Westinghouse Micarta	8.83 ft. by 6.51 ft.	250	2000
7	Westinghouse Micarta	8.5 ft. by 5.69 ft.	100	1500
8	Supreme No. 750	8.5 ft. by 5.25 ft.	100	1400
9	American No. 1	8.49 ft. by 5.25 ft.	90	1400
10	Dakota Fahlin	8.33 ft. by 5.25 ft.	100	1400
11	Dakota Fahlin D-500	7.0 ft. by 3.66 ft.	55	1815
12	American No. 12	8.79 ft. by 5.5 ft.	180	1800
13	Paragon 60A	8.66 ft. by 5 ft.	90	1400
14	Paragon 60B	8 ft. by 4.5 ft. to 5 ft.	120	2000

INTER-DEPARTMENTAL AIRWAYS COMMITTEE

AT the suggestion of President Hoover, a meeting was held May 9th to make arrangements for the organization of an Inter-Departmental Committee on Airways. A committee was formed composed of the following representatives of the Post Office Department and the Department of Commerce: W. Irving Glover, Chas. C. Gove, E. B. Wadsworth, Wm. P. MacCracken, Jr., F. C. Hingsburg, and Harry H. Blee, to consider, study and pass on applications for the extension of the civil airways of the United States.

In this work the committee will set a time and date at which hearings may be held for the purpose of entertaining suggestions and applications for the establishment, extension and modification of airways. It will be possible for interested persons representing cities throughout the country, including members of Congress, mayors and representatives of civic organizations, as well as private individuals, to appear before this committee at a public hearing in the interest of airways. It is the aim of this committee that all interested in the establishment of airways be present at the hearings or that they send by mail a letter or petition relative to their views in order that the subject may be thoroughly presented and discussed from all viewpoints.

INSTRUCTIONS FOR FOREIGN FLIGHTS

THE Department of State has issued instructions for the arrangement of American airplane flights over European territory, pending the formation of international regulations for aerial navigation. The arrangements will be handled by the State Department through the American Embassy at Paris.

According to the instructions, all requests made to American diplomatic and consular officers for assistance in securing permission from foreign governments for American pilots and American airplanes to make flights over their territory must be referred to the Aeronautics Branch, Department of Commerce, through the Department of State, for the purpose of determining whether the pilots and planes meet with the requirements established by that Department for commercial and private aviation. Upon being informed by the Department of Commerce that there is no objection to a proposed flight, the State Department will advise the American Embassy in Paris to that effect, giving all pertinent data relating to the pilot and the airplane, including a list of the countries over whose territory the flight is to be made.

The American Embassy in Paris will then advise each of the other American missions concerned, requesting it to ask permission of the appropriate authorities for the flight in question. Following receipt of the initial notification of the flight, all questions relating thereto will be handled so far as possible by the American Embassy in Paris without reference to the State Department.

Look to Goodyear

Any idea, any question that you bring to Goodyear gets prompt attention and understanding. For here is a large department that has just one duty—to do everything within power of The World's Greatest Rubber Company to assist the progress of aviation. If you design aircraft, or build them, if you operate planes, or air transport lines, look to Goodyear for any data, or advice, or equipment that is concerned with rubber. Write, wire, phone, or come personally.

Aeronautics Department
Goodyear, Akron, Ohio
or Los Angeles, California

EVERYTHING IN RUBBER FOR THE AIRPLANE

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REGULATIONS FOR AIRPORTS OF ENTRY

REGULATIONS for the maintenance of airports of entry into the United States have been drawn up by the Interdepartmental Committee on Airports of Entry, and have been signed by the Secretaries of the Treasury, Commerce, and Labor. According to these regulations specific airports will be named where a need exists. Municipal airports will be used where possible, though all such ports of entry must present a high Department of Commerce rating. They must also provide offices for officials without charge and offer special loading facilities, and charge clearing aircraft approved rates.

BIDS ON SEATTLE VICTORIA ROUTE

THREE bids were submitted to the Post Office Department for the Seattle-Victoria air mail route. They were the Barnes and Gorst Air Lines, Inc., Seattle, $0.76 per mile; Boeing Air Transport, Inc., Seattle, $0.8035 per mile; and Allied Aviation Industries, Inc., St. Louis, Mo., $1.85 per mile.

This service picks up mail in Seattle and delivers it to outbound vessels at Victoria and picks up mail in Victoria from incoming boats and brings it to Seattle in advance of the boat's arrival. The approximate distance is 76 miles. The present requirements of the service are about 12 round trips a month.

N.A.C.A. ENGINEERING RESEARCH CONFERENCE

SAFETY and economy in the operation of commercial aircraft were the considerations of chief interest at the meeting of representatives of the aviation industry with the National Advisory Committee for Aeronautics at Langley Field, Va., on May 14. The research program of the committee for the coming year will follow suggestions made at the meeting.

Methods of eliminating the tail spin, increasing the lifting efficiency of airplane wings, problems of engine cowling and cooling, a study of increased propeller efficiency and further reduction of wind resistance by streamlining were among the topics discussed.

The First Airplane Passenger

MAY 14TH was the twenty-first anniversary of the first airplane passenger flight. On this day, 1908, one of the Wright brothers flew Charles Furnas, an employee, over the sand dunes of Kitty Hawk in the course of their refresher flights in preparation for the demonstration to be made for the American and other governments. These renewed flights were also undertaken to test the carrying capacity of the machine and to ascertain its speed with two men aboard, as well as to regain familiarity with the handling after a lapse of almost three years.

The airplane was the same as was used in the 24-mile flight of 1905 at Dayton, Ohio. The means of control remained the same but the position of the elevator and combined rudder and warping levers and their direction of motion were altered in order to permit the operator to take a sitting position.

Myhres Pilots Simplex Plane 30,000 Miles

THIRTY thousand miles without repairs of any kind to plane or engine is the record established with a Simplex plane in the past five months by H. S. Myhres of Los Angeles. He recently completed a round trip to the West Coast.

In five weeks, Myhres flew nearly 12,000 miles, in all varieties of weather and altitude, through mountain canyons and penetrating blinding blizzards, landing and taking off on fields where snow was as deep as ten inches, and came back to the Simplex Airport without a scratch on his plane's wings and without a wrench having been placed on its Warner engine.

Such stormy flying conditions and such heavy clouds were encountered in the Rocky Mountains that he did not dare attempt to go over the mountains for fear of losing his way completely and possibly cracking up against a mountain side. Hence it was necessary, he relates, to follow the railroads through canyons. Several times this procedure led him to the mouth of tunnels, which compelled him to turn within the narrow walls of the mountain passes, retrace his way to the first by-pass, and work around the mountain by circuitous routes until he again could pick up the line of the railroad.

After spending some time in Los Angeles and San Francisco, he worked into the Northwest.

Heading back east across the northern tier of states, Myhres bucked almost impossible flying conditions all the way to Minneapolis.

Leaving snow behind at Minneapolis, Myhres had good flying conditions to Chicago, whence he went to Defiance, Ohio, in an hour and a quarter.

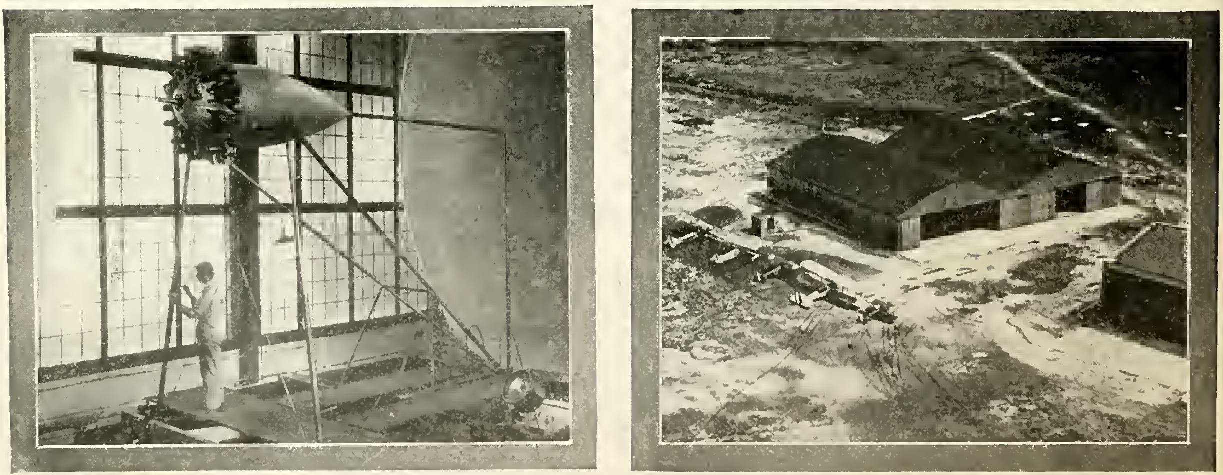
Prior to starting the western trip, Myhres had flown the same Simplex to Florida and New York. He went west via the southern route, so that his 30,000 miles of flying in five months have carried him into nearly every airport of importance in the United States.

PAUL J. KANUIT, S. J. Samson, air mail pilots, and Lieut. John H. Tilton, Army Air Corps Reserve, all saved their lives recently by using parachutes. By this act they are eligible for the Caterpillar Club, sponsored by the Irving Air Chute Company.

CRAMER FLIGHT TO ALASKA AND RETURN

PARKER D. CRAMER recently flew from Detroit to Nome, Alaska, and the eastern coast of Siberia, and return to New York City in a Warner-powered Cessna monoplane in a survey of the possibilities of United States-Alaska air travel. Willard S. Gamble accompanied Mr. Cramer on the 10,000-mile trip. Maintenance for the flight consisted only of greasing rocker arms, oiling valve stems, adjusting clearances on two

(Continued on next page)



© National Advisory Committee for Aeronautics

Wind tunnel and hangars of the National Advisory Committee for Aeronautics at Langley Field, Virginia

True vision sees clearly the end to which it works. It first builds a firm foundation. It rises step by step. When it finally reaches its ultimate goal, there is behind it a structure of such enduring soundness that it can never totter, much less fall. That is the vision which characterizes the Buhl Aircraft Company, whose ancestry is 96 years of successful operation in many fields. The planes it builds are daily winning new renown wherever they spread their wings. Its manufacturing, administration and dealer policies—plus the scope of its present and contemplated activities—have won for it an impressive name throughout the industry.

We shall be pleased to mail catalogs or details of our attractive dealer plan.

DISTRIBUTORS

CALIFORNIA—*Porter-Hughes Aircraft, Clover Field, Santa Monica*

IN THE NORTHWEST—Mamer Flying Service, Spokane, Wash.

MASSACHUSETTS—Wetmore-Savage Aircraft Corp., Boston, Mass.

BUHL

MARYSVILLE, MICHIGAN

AIRCRAFT...COMPANY

DISTRIBUTORS

OHIO—Johnson Flying Service, Dayton, Ohio

EASTERN CANADA—National Air Transportation, Ltd., Toronto, Ont.

MANITOBA, SASKATCHEWAN, ALBERTA, CAN.—*Cherry Red Air Lines, Ltd., Prince Albert, Sask.*

Parker Cramer and Cessna he flew to Alaska and the east coast of Siberia, and return.

(*Continued from preceding page*)

valves and cleaning one plug.

The trip to Nome was made in 44 hours' flying time, or at an average speed of 95 miles per hour. On his flight north Cramer stopped enroute at Minot, N. D., Regina, Saskatchewan, Saskatoon, Edmonton, Jasper, Hazleton, Whitehorse, Dawson and Fairbanks.

Paragon Propellers Receive Approved Type Certificates

J. E. MENAUGH COMPANY of Chicago, Illinois, has recently been appointed representative in the Central West for Paragon Engineers Inc., Baltimore, manufacturers of Paragon propellers. Two new Paragon designs, for 90 horsepower at fourteen hundred and 120 at two thousand revolutions per minute—have recently been given approved type certificates by the Department of Commerce.

SEVEN-DAY DURATION RECORD ESTABLISHED

As we go to press, R. L. Robbins and James Kelly have just landed at Fort Worth, Texas, after flying continuously for 172 hours, 32 minutes and 1 second. Their flight was made by means of refueling and, when the barograph has been officially calibrated, will constitute a record for duration flying by means of refueling. The *Fort Worth,* as the plane is called, is a reconditioned Ryan monoplane fitted with a Wright J-5 Whirlwind engine. Robbins and Kelly flew nearly a day longer than the Army Fokker, *Question Mark,* which in January established a record of 150 hours, 40 minutes and 15 seconds. The fact that they were forced to descend at the end of 172 hours was not because of any engine failure or physical exhaustion on the part of the fliers themselves, but resulted from a crack in the propeller, which had been struck by some object during the flight.

SCHEDULE OF COMING AERONAUTIC EVENTS

June 2. Air Meet, Buffalo, N. Y.

June 10-14. Michigan Air Tour and dedication of Pontiac Municipal Airport.

June 14-15. Dedication of municipal airport, Memphis, Tenn.

June 14-15-16. Legion Second Annual Air Circus, Elkhart, Ind.

June 19-22. F. A. I. conference, Copenhagen, Denmark.

June 22. Dedication of the Wilkes-Barre Airport at Wilkes-Barre, Pa.

June 27-30. International Light Plane Meet, Amsterdam, Holland.

July 6-8. Air meet and dedication of airport at Bradford, Pa.

July 16-27. 7th International Aero Exhibition, Olympia, London, England.

August 24-September 2. National Air Races and Aeronautical Show, Cleveland, Ohio.

September 6-7. Schneider Cup Race, over the Solent, Cowes, England.

September 15-21. Aviation Meet, Sioux Falls, So. Dak.

September 28. Gordon Bennett Balloon Trophy Race, Laclede Gas Co. property, 8900 South Broadway, St. Louis, Mo.

October 5-21. National Air Tour for the Edsel Ford trophy.

October 12-27. Southwestern Aircraft Exposition, State Fair Grounds, Dallas, Tex.

December 1-9. International Aeronautical Exposition of the Aeronautical Chamber of Commerce, Chicago, Ill.

NEW YORK

Aero Supply Mfg. Co., Inc.

THE Aero Supply Mfg. Co., Inc., was formed recently through the merger of the Aero Supply Mfg. Co., Inc., of New York; the Standard Automatic Products Corporation, of Corry, Pa.; and the National Steel Products Company of Dayton, Ohio. George I. Stich is president of the new organization and also of each of the three merged companies.

The physical operation of the plants will continue as before, and each will preserve its identity. Headquarters will be at the Aero Supply offices at College Point, Long Island.

LYMAN H. JOHNSON has been appointed to assist Clifford W. Henderson in the direction of the aircraft show section of the Aeronautical Chamber of Commerce. Mr. Johnson will assist Mr. Henderson in the management of the National Air Races and aeronautical exposition at Cleveland in August, and will act as a full time assistant manager of all future shows sanctioned by the Aeronautical Chamber of Commerce.

WALTER CLARE MARTIN is making a survey of the interest in aviation in Kansas to organize state plans for future aeronautical development. Mr. Martin is operating on the advice of the Beveridge Promotion Service and the Minerva Beveridge Co., of New York City.

CURTISS AEROPLANE EXPORT CORPORATION recently delivered four Sikorsky amphibions to the Inter-Island Airways of Hawaii for use in passenger and mail service among the territorial islands. A Curtiss Fledgling was sent to Argentina for demonstration.

AN arrangement has been made with the Atlantic Air Service, Inc., by which the corporation will supply incoming passengers aboard Holland-America steamships with air service to any point called for east of the Mississippi River, using the Newark Municipal Airport as a base, according to announcement made today by W. Van Doorn, general manager of the Holland-America Line in this country.

THE Medal of Honor was awarded recently to the Airmap Corporation of America for its aerial photograph showing the *S. S. Mauretania* steaming up New York Harbor when exhibited at the International Aerial Photographic Salon, Paris, France.

(*Continued on next page*)

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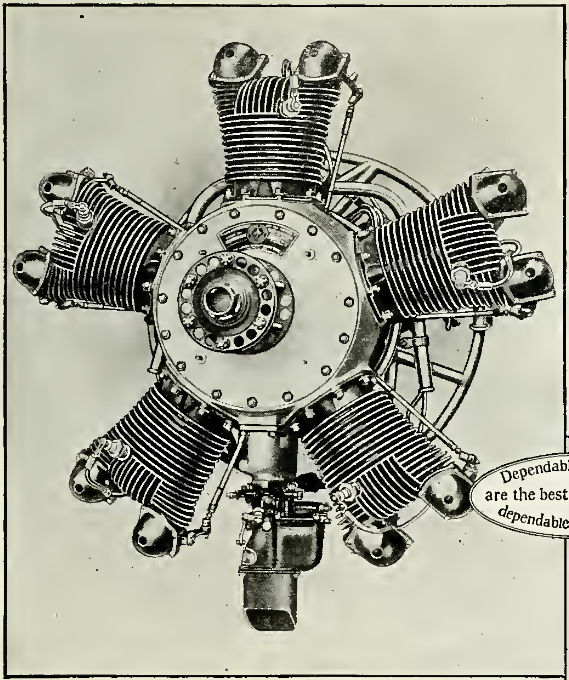
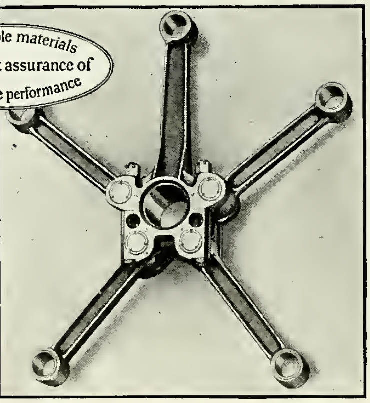
AIRCRAFT ENGINES
LE BLOND
MADE IN THE U.S.A.


Dependable materials are the best assurance of dependable performance

LEFT: Five-cylinder LeBlond aircraft engine, mfd. by THE LEBLOND AIRCRAFT ENGINE CORPORATION, Cincinnati, Ohio.

BELOW: Nickel Alloy Steel connecting rod assembly of LeBlond aircraft engine.



NICKEL ALLOY STEEL

used for 26 highly stressed parts of

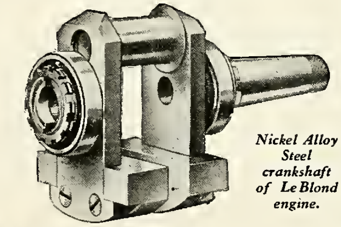
LEBLOND AIRCRAFT Engines

THE Le Blond aircraft engine, the first in its class to pass the grueling fifty-hour U. S. Navy test, is specially designed to provide fast assembly and dis-assembly, more power and low operation costs. Twenty-six highly stressed parts of the Le Blond engine are made of Nickel Alloy Steel.

Extensive tests have shown that the average, maximum and minimum values of Nickel Alloy Steels vary less from heat to heat than other commercial steels. In the manufacture of machinery, where it is impractical to test the individual properties of each piece of steel used, this feature is particularly important.

Probably the most impressive evidence of the uniformly dependable mechanical properties of Nickel Steel parts is the fact that practically all manufacturers of airplane engines, both in America and Europe, have adopted Nickel Alloy Steels for highly stressed parts, the weight of which must be pared to a minimum.

Information on the properties and applications of Nickel Alloy Steels will be gladly furnished by our staff of engineers.



Nickel Alloy Steel crankshaft of Le Blond engine.

Nickel
FOR ALLOY STEEL

Nickel Alloy Steel Parts of Le Blond Aircraft Engine

Magneto drive shaft*
Cam drive gear*
Oil pump drive gear*
Tappets
Piston pin • Wrist pin
Cam follower roller
Propeller hub bolt
Starter nut
Oil pump drive shaft
Oil pump drive gears
Valve spring washer
Cam drive shaft
Cam timing flange
Master connecting rod
Connecting rod link
Connecting rod bolt
Rocker arm
Propeller hub key
Studs • Crankshaft
Cam • Cam follower
Push rod socket
Cam drive idler shaft
Push rod ball end

*Parts marked with asterisk are Nickel Steel. The rest are Nickel Chromium Steel.

SEND FOR "BUYERS' GUIDE TO NICKEL ALLOY STEEL PRODUCTS"

INCO NICKEL THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL STREET, NEW YORK, N. Y. INCO NICKEL

(New York News continued)

MYRON S. HUTCHINSON has joined Air Associates, Inc., as manager of airplane sales. Mr. Hutchinson was formerly general sales manager for the General Aviation Company, Inc., of Syracuse.

THE magneto compass, recently developed by the General Electric Company, has been put on the market. This compass has an armature about the size of a walnut which operates at a low speed, and the entire instrument weighs 8 pounds.

The new compass is a remote indicating device, operating on the principle of the earth inductor compass. Its chief advantages rest in the use of pole pieces which give the directional effect and, at the same time, concentrate the lines of force of the earth's magnetic field, thereby producing a denser field in which to operate.

NEW YORK AIR TERMINALS, INC., has announced plans for the development and operation of a series of aviation fields in the New York metropolitan area. The concern will restrict its operations to terminal development and maintenance.

Three seaplane bases and three airports are planned. The seaplane bases will be at Black Tom, at North Beach, Queens, and in the Hudson River between Sixty-ninth and 140th streets. Speed boat service will connect the Black Tom site with Manhattan. Besides its airports at Hadley Field and Secaucus, the corporation plans one north of the city. A seaplane base will be operated in connection with the Secaucus Field. Curtiss Airports Corporation owns an interest in New York Air Terminals, Inc.

MAJOR E. H. BRAINARD, chief of Marine Corps aviation, resigned to become vice president of the Curtiss Flying Service in charge of operations and schools. The resignation was effective May 31, on which date Major Brainard established his headquarters in the new building of the Curtiss organization in New York City. Lieut. Col. Thomas C. Turner will succeed Major Brainard as chief of Marine aviation.

In his new work Major Brainard will have direction of flying activities of twenty flying fields. The company expects to open twenty more fields for operation during the coming year.

FRANK A. CASSATA of 2630 Cropsey Avenue, Brooklyn, N. Y., is organizing a flying club in Brooklyn, and invites the participation and coöperation of those interested in his vicinity.

Curtiss Airports Corporation

CURTISS AIRPORTS CORPORATION was formed recently by the Curtiss-Keys interests to establish and operate a nation-wide chain of airports and air terminal facilities. The new corporation will acquire and operate a chain of airports extending from New York to San Francisco and from Chicago down the Mississippi River to St. Louis and below.

While the corporation proposes to engage primarily in the management, development and operation of its airport chain, it will be privileged under its charter to engage in all other forms of flying activities. Construction work will be under the general supervision of the Stone & Webster Engineering Corporation and Charles M. Franzheim & Company, Architects.

American Aeronautical Corp. Begins Construction of Plant

CONSTRUCTION of the main plant at the air terminal of the American Aeronautical Corporation on Manhasset Isle, near Port Washington, L. I., was started recently with the erection of the steel framework. Work on the ramps, runways, platforms and bulkheads has been under way for some time at the land and seaplane terminal. When completed, the airport will represent $1,500,000 in construction, and will be one of the largest seaplane bases in the world.

SHIP to shore airplane service cutting the time between New York and channel ports to four days will be inaugurated this summer by the North German Lloyd lines, according to a recent announcement of Hans Schuengel, American director of the lines.

A new catapulting device is being installed on the new liner *Bremen,* which will start its maiden voyage July 17.

The catapult will be located on top of the sun deck, and will permit of launching an airplane without slackening the speed of the liner. The plane will leave the ship 600 miles from its destination and, with the 26½ knot speed of the liner, will make possible the four day trans-Atlantic service. Mails only will be carried on the planes at first.

A DEALERS and distributors section of the Aeronautical Chamber of Commerce for the New York metropolitan area was formed by the sales organization of New York City at a recent meeting with officers of the Chamber.

WILLIAM E. BERCHTOLD was recently appointed manager of the information section of the Aeronautical Chamber of Commerce. Mr. Berchtold succeeds Stanley A. Hedberg, who is now associated with the Pratt and Whitney company of Hartford, Conn.

E. LOGAN HILL has been elected vice president and director of Atlantic Coast Airways, Inc., with offices in New York City. Mr. Hill was formerly assistant to the president of Colonial Airways.

AIR ASSOCIATES, INC., opened its new hangar recently at the Chicago Municipal Airport. The building is two stories high. The main floor houses complete machine, woodwork and paint shops, and general overhaul equipment, besides a large space for the storage of airplanes and a showroom supplied with general equipment. On the second floor are offices of the manager and operating staff, wash rooms, shower baths, and at the front section a large lounging and observation room.

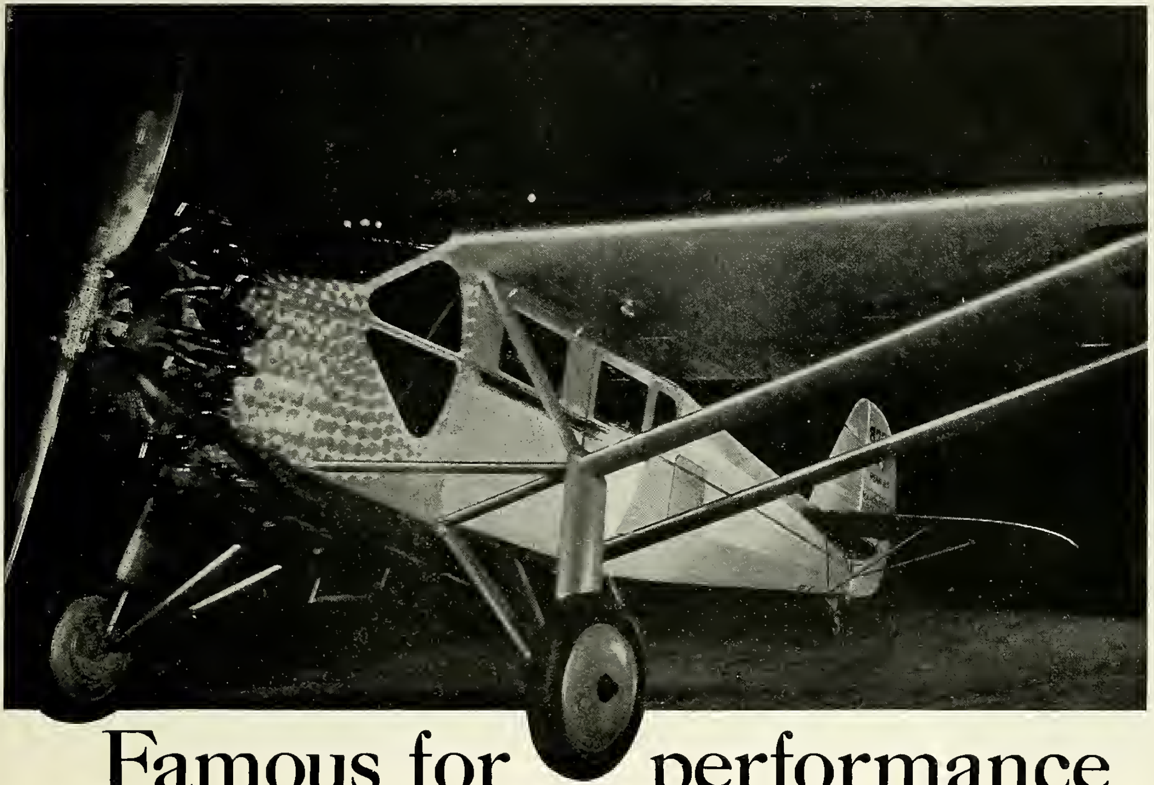
SHIPMENTS of airplane instruments manufactured at the Long Island City plant of the Moto-Meter Company show a gain of 386 per cent in the first three months of 1929 over the corresponding period of 1928. These Moto-Meter instruments included ice warning devices, fuel pressure gauges, oil pressure gauges and oil thermometers.

J. VON DER HEYDEN was recently appointed director of sales promotion of the Consolidated Instrument Company of America, Inc. In his new capacity Mr. von der Heyden will maintain contacts with airplane and motors manufacturers.

EARL L. HOUSE now represents the Moth Aircraft Corporation in Metropolitan New York and Long Island, the eastern part of Pennsylvania and the States of New Jersey and Connecticut. Orders for forty-three Moths have been placed for this territory.

International Newsreel Photo

The Junior Aviation League of New York City holds its first outdoor meet and contest.



Famous for performance

Built for SAFETY!

You don't have to be a Lindbergh to judge the exceptional air-worthiness of the Ryan. One inspection tells you that here is no fair weather ship, but a craft engineered to withstand the unexpected stress and strain of dirty weather.

You see it in the Ryan's externally-braced wing construction—the strongest known. Its superiority to other types is readily apparent when you consider the heavier pay loads ships must carry today. Furthermore, it permits adjustments to compensate warping, which are impossible in the cantilever type wing.

You see it in the exclusive Ryan designed chassis with axle of Chrome Molybdenum steel tubing—the landing gear that stood up under the terrific shock of two and one-half tons weight on the take-off of the historic Paris flight. A landing carriage that will stand the gaff when you hit the dirt of the roughest fields.

You will see it, too, in the braces through the center of the Ryan's cabin. No other ship offers this safeguard to passengers and plane against the racking strain of rough landings. It adds materially to the life of the ship. And if the fabric were removed, you could see it again in the steel-tubing fuselage, master-welded at the joints and braced against torque and strain by diagonal steel members. Such *plus* construction characterizes the Ryan from spinner cap to rudder. It makes the world's most famous ship the safest, too.

Take-off with load
8 seconds, 275 ft.
Climb, 1200 ft. per min.
Top Speed, 140 m. p. h.
Cruising Speed
120 m. p. h.
Service Ceiling
18,000 ft.
Absolute Ceiling (light)
25,000 ft.
Landing Speed
50 m. p. h.
(Lands within a 200-ft. circle)
Department of Commerce
Approved Type
Certificate No. 142

As to performance, the whole world knows what the Ryan can do. Here (at left) are a few details which "Red" Harrigan, at the factory, or any Ryan distributor, will gladly demonstrate.

Send for new, illustrated catalog of the new Ryan Brougham for six, powered by the Wright Whirlwind J-6 engine. Mahoney Ryan Aircraft Corporation, Lambert-St. Louis Airport, Anglum, St. Louis County, Missouri.

The New · RYAN · Brougham
Model For Six

SISTER SHIP OF THE "SPIRIT OF ST. LOUIS"

(*New York News Continued*)

THE first commercial trans-Atlantic flight, planned by Dr. Adolph Rohrbach in a Rohrbach Rostra flying boat, was postponed from May 15 to June 1. The ship was to carry a 2,000-pound cargo from Lisbon, Portugal, to New York City.

The delay in the start, originally scheduled for the fifteenth of May, was caused by unsatisfactory engine performance, according to Dr. Rohrbach. The two European motors with which the Rostra was equipped were changed for American Pratt and Whitney Hornet air-cooled engines of 575 horsepower which will be fitted with reduction gear for use on the flying boat.

THE Gates Aircraft Corporation recently purchased a new factory and hangar in Corona, Long Island, N. Y., where the R. S. V. French convertible plane will be put into production. The new plant is 100 by 120 feet, and is two miles from Holmes Airport where the corporation bases its operations. The planes will be made at the factory and taken to the airport for assembly.

GATES FLYING SERVICE, INC., of New York, will take over the distribution of the products of the Swallow Aircraft Company of Wichita, Kans., for the territory of metropolitan New York and northern New Jersey. Deliveries are to start at once. In addition to the regular staff of Gates pilots, several others are to be added for sales and demonstration work.

WALTER S. PEPER has joined the sales division of the Curtiss Flying Service, Inc., in the capacity of regional sales director. He will be in charge of airplane sales for New York and New Jersey.

FOUR new directors of Air Investors, Inc., were recently appointed, according to an announcement of Harvey L. Williams, president of the corporation. The new members of the directorate are Robert Lehman, William B. Stout, W. W. Crocker and Seymour H. Knox.

THE *Bremen*, the only airplane to make a successful western non-stop passage of the north Atlantic Ocean, was unveiled in the Grand Central Terminal, New York City, on May 21, where it was placed as a gift to the city. The historic plane was presented to the people of New York by Baron Guenther von Huenefeld, who made the gift through the Museum of the City of New York.

The plane which flew from Dublin on April 12, 1928, was placed on exhibition in the concourse of the Grand Central Terminal where it is suspended from the high roof above the New York Central's transportation exposition on the east balcony.

ORDERS for 300 tachometers for the Navy and 550 air speed indicators for the Army have been received by the Consolidated Instrument Company of America, Inc., according to officials of the concern. The airspeed indicators for the Army Air Corps are of a new design utilizing the Pitot-static principle, and with all mechanism made of non-corrosive materials.

FITZMAURICE FLYING FIELD at Massapequa Park, Long Island, was opened and dedicated on May 12. This 30-acre field is designed for the use of commuters who buy homes in the surrounding real estate development.

M. L. JEFFREY has been appointed assistant to Guy Vaughan, vice president and general manager of the Wright Aeronautical Corporation. Mr. Jeffrey will assume charge of production activities in connection with the new Whirlwind series of Wright engines.

ATLANTIC COAST AIRWAYS will inaugurate a New York-Atlantic City seaplane service on June 15, according to a report made by E. Logan Hill, vice president of the firm. Six 14-place seaplanes will maintain the schedule.

ORDERS for instruments and instrument boards to equip 575 planes were received recently by the Consolidated Instrument Co., of America, Inc. The ordering manufacturers were the Gates Aircraft Company, U. S. Aircraft Corporation, and the St. Louis Car Company. An order for 1,000 type B instrument panels was received from the Alexander Aircraft Company, of Colorado Springs, Colo.

R. C. PIERCE, consulting engineer, is being retained by the Sikorsky Aviation Corporation of College Point, Long Island, to handle research and mechanical development. Mr. Pierce was formerly a captain in the Army Air Corps.

THE Enna Aeronautical Club was organized recently in New York City. It conducts weekly lectures on the theory of aviation, including aerodynamics, motors, rigging, meteorology, navigation and maintains a library of up-to-date books and aeronautical magazines.

FOLLOWING objections to various sites for a seaplane base on the Hudson River at New York City proposed by the Dock Department, Mayor Walker appointed a committee to survey the river for unobjectionable sites. The committee appointed to study the situation consists of Arthur S. Tuttle, Herman H. Smith and Peter Brady.

PIONEER instruments will be installed on all Argo planes, according to a recent agreement reached between the Alliance Aircraft Corporation, Alliance, Ohio, makers of the planes, and the Pioneer Instrument Company of Brooklyn, N. Y.

PIONEER navigational equipment will be installed in all 1929 Travel Air cabin planes, according to Charles H. Colvin, president of the Pioneer Instrument Company of Brooklyn, N. Y. A shipment of 500 sets of instruments, which are set in the new Pioneer instrument panels, was the initial order sent to the Travel Air company of Wichita, Kans.

ALBANY

[H. F. WOOD]

ACCOMPANIED by a half dozen of his aides, Palmer Canfield, prohibition administrator for the Albany district, recently made an aerial survey of the northern New York territory in which he plans to wage an active campaign against border rum runners. The flight was made in the Ford tri-motor operated by Mohawk Airways, Inc., and piloted by George W. Emerson.

WITH the institution of the new night schedule, the Albany-Cleveland run of Colonial Western Airways has been split into two sections, with Buffalo as the dividing point.

OFFICIALS of the Colonial Airways System have announced that the new $70,000 hangar on the Albany airport is nearly completed. Meredith Warren, formerly of Brooks Field, is to be in charge of the building.

Not only will the operations offices of Canadian Colonial Airways and Colonial Western Airways be located in the building, but also a passenger terminal will be maintained there. The hangar also provides accommodations for pilots and mechanics, a class room and a store room.

A $30,000 hangar is being planned at the Albany Airport by Mohawk Airways, Inc., a concern of Albany and Schenectady business men recently organized for hopping and charter flight service.

ESTABLISHMENT of a chain of ground schools throughout northern New York and along the Hudson Valley is being planned by Flyers, Inc., according to A. R. Mabry, director of the Flyers Institute of Aeronautics.

NORTHERN NEW YORK

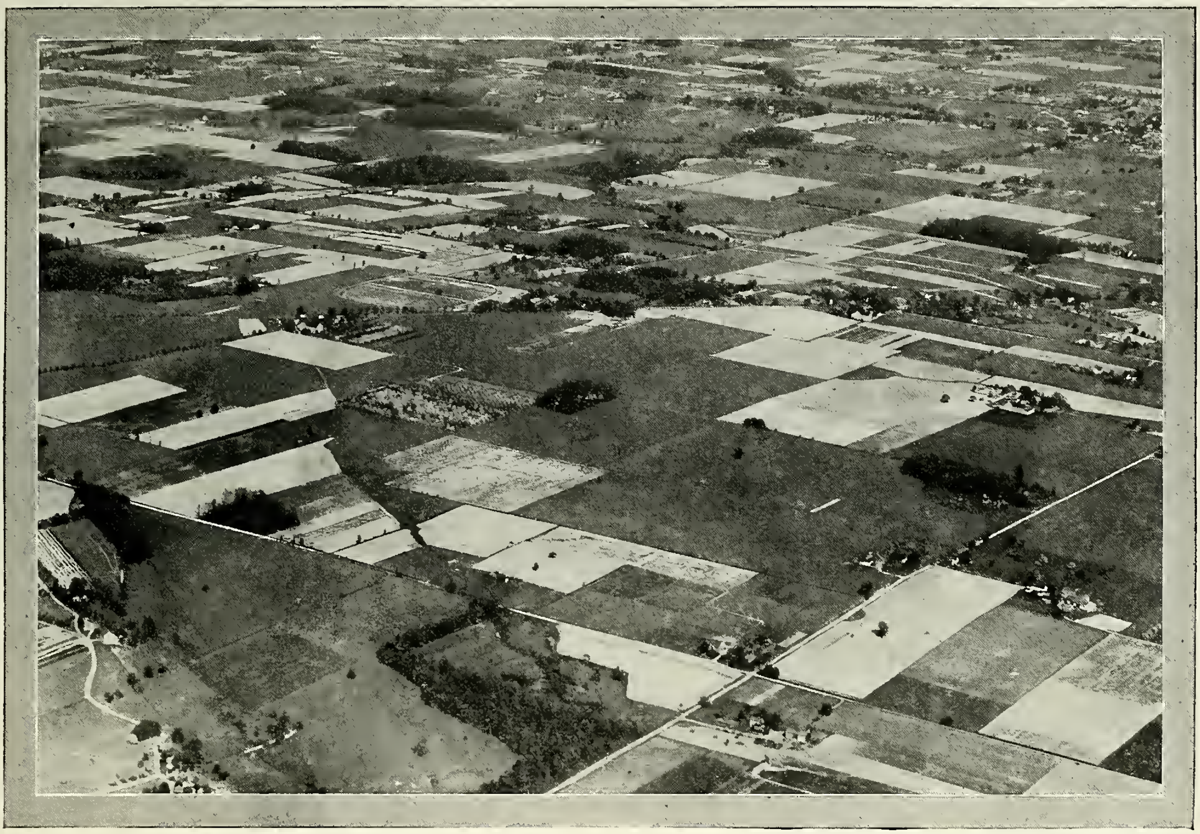
[ROLLIN JONATHAN FAIRBANKS]

A LARGER hangar is to be erected at the Watertown municipal airport by the F. H. Taylor Flying Service, Inc., so as to offer more room for visiting planes. The city is placing a guard fence about part of the flying field proper at a cost of about $1,500, thus preventing the parking of cars too near the runways. The agency for the Arrow Sport plane has been secured by the F. H. Taylor Flying Service. The Stinson agency is also held by the concern.

A restaurant has been built at the municipal airport by Mrs. F. H. Taylor. It is of an unique design, being modelled after the Stinson biplane. The wings are made into porches while the fuselage contains a small dining room, kitchen, and supply room.

IT has been reported that the Wilmington airport has been leased by Christy Mathewson, Jr., and Eugene Keet. Both Mathewson and Keet did considerable business in passenger hops last winter at Saranac Lake.

(*Continued on next page*)



Pitcairn Field, Philadelphia (Willow Grove), Pa.

LEARN TO FLY WITH PITCAIRN THE AIR MAIL OPERATORS

The rapid extension of Air Mail, passenger and express lines requires more and more planes and pilots to operate them. Salesmen-pilots will also be in demand by allied industries which serve airplane manufacturers and operators. Opportunity in the field of aviation is greater today than ever before.

The Pitcairn method of instruction is based upon our experience as airplane manufacturers and as extensive Air Mail operators, resulting in an intimate knowledge of just what a pilot should be taught to qualify for private flying and general commercial work.

Learn to fly at a Pitcairn School. Courses of 10, 20, and 50 hours are offered, together with a complete ground course. Many of our instructors are former air mail and army trained pilots, recognized as the best of flyers.

A booklet giving detailed information on Pitcairn methods of instruction, with a synopsis of the courses, will be mailed at your request. Ask for the booklet, "Flight." Write today.

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Atlanta, Ga. . . .	Candler Field

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(New York News Continued)

BINGHAMTON

[JOHN B. G. BABCOCK]

RICHARD L. BENNETT, local pilot and manager of Bennett Field, one mile north of Binghamton, has purchased three portable buildings from the city and will erect a hangar, 80 by 100 feet in size. Space also will be provided at the field for a waiting room, refueling and machine shop facilities, restaurant, and locker room. Regulation field markings are being reconditioned and the 156-acre area will be in good shape for use by planes throughout the season. Bennett has 21 students enrolled for his flying school this year, and instruction was inaugurated May 5.

PURCHASE of a 110-acre farm eight miles north of Binghamton by a new corporation with reported authorized capitalization of $100,000 is to be followed by immediate development of a commercial airport on the area, according to C. J. Cameron of Detroit, Mich., and William D. Wood of Clearwater, Fla., principals.

The site is virtually level throughout, and comparatively free from obstructions or hazards. Runways 2,500 feet in length can be laid out, with landing possible from all directions.

BINGHAMTON'S new commercial airport will be dedicated and officially opened on June 1.

THIS community now has four aviation fields available to fliers. These are Bennett Field, 156 acres, one mile north of Binghamton; the Merchart farm, 80 acres, three miles east; the Watrous farm, 110 acres, 10 miles north; and the West Endicott field of 100 acres, 10 miles west of the city.

Bennett Field is leased and operated by Richard L. Bennett. The Merchart farm was leased recently by local men who will specialize in the repair and reconditioning of planes and engines. The Watrous farm was purchased recently by C. J. Cameron and W. D. Wood.

The West Endicott field, owned by the Endicott-Johnson Shoe Manufacturing Corporation, has been leased to Colonial Western Airways for development as the chief stop on that company's proposed new direct route beween Buffalo and New York.

PLANS are being developed for an air meet here, on Bennett Field, during the annual conference of New York state mayors and other city officials, to be held June 18, 19 and 20. The Endicott Aero Club is planning to hold an air meet at the West Endicott field June 8 and 9. Five Army bombers will be there, according to officers of the club.

THOMAS Z. FAGAN, vice president of the Scintilla Magneto Co., of Sidney, 30 miles north of Binghamton, says that production is being stepped up at that plant, and that more than 500 workers are now employed there. He reported that 2,000 magnetos are now being manufactured each month at the Sidney plant.

WESTERN NEW YORK

[ROLLIN JONATHAN FAIRBANKS]

A CHARTER has been granted to the Trott Aviation Club Pioneers, Inc., of Niagara Falls to promote aviation. The following men, all of Niagara Falls, are the directors: Joseph Birmingham, William C. Hilliard, John Kracht, Morris W. Coleman, Sally Durfee, George R. Mead, F. Paul Staglich, Fred P. Jarnov, Joseph F. Brice, and Harrison F. Taylor.

DUE to the increased demand for a lower priced parachute the Irving Air Chute Company, of Buffalo, is now producing a parachute of Japanese pongee. These new parachutes will be made the standard equipment by the Curtiss Flying Service, Inc., and the National Flying Schools, Inc.

THE Consolidated Aircraft Company is turning out two Fleet planes a day now for the Fleet Aircraft Company. It is expected that this will be increased to three planes a day by July.

THE Consolidated airport, which is located on Military Road just outside of Kenmore, is now being operated by Niagara-from-the-Air, Inc., and passenger flights are being made in the Consolidated model 10 ship. The National Flying Schools, Inc., is also operating from this airport, using Fleet planes for instruction.

THE Navy patrol boat XPH-1 being built by the Hall Aluminum Aircraft Company of Buffalo is rapidly nearing completion.

It is understood that Col. V. E. Clark, with a staff of engineers, is designing a large flying boat for commercial work. The ship will be a monoplane and so constructed to operate in a heavy sea.

CENTRAL NEW YORK

[MILDRED MARVIN]

GROUND was broken recently for the new $60,000 hangar to be erected by the General Aviation Co., Inc., at the Syracuse-Amboy municipal airport. The building will occupy a site east of the present building and the municipal hangar. The new hangar will be 120 feet square with 20-foot lean-tos on each side, making its size over all, 120 by 160 feet.

Gruynn W. Hoyt, general manager of the company, announced that the hangar will be used to store the company's planes, as a classroom for ground school students, and as a major repair shop.

The new building will be completely equipped with plumbing, lighting and heating plants. One of the features of the new building will be a glass inclosed passengers' waiting room where patrons can watch operations while waiting for their particular plane to land.

SYRACUSE is establishing a new mark in the number of men and women learning to fly at the municipal airport. Three aviation companies and one individual are at present giving flying instructions to 62 students. General Aviation Company, Inc., heads the list. Gruynn W. Hoyt, general manager announces that the instructors in his company are teaching 36 students, nine of whom are women. General Aviation also has enrolled in its ground school 16 students who are not taking flying lessons. The Syracuse Branch of the Curtiss Flying Services, Inc., established recently, is teaching 16 students to fly.

The Empire Air Transport, Inc., the newest Syracuse aviation concern, has already signed seven students for flying instruction. Emil Roth, Jr., vice president and general manager, has announced that two flying clubs of 15 members each are in process of formation and members will begin taking instructions as soon as arrangements are completed.

THE Department of Commerce has approved the location of the fair grounds property at Newark as the site of the proposed landing field on the Albany-Cleveland airways, according to word received recently from John Beardslee, civil engineer of the Department, who made a survey of the field.

The Government will expend approximately $10,000 to put the field in shape and equip it with beacons and other equipment.

The village appropriated $10,000 to buy the site, which contains approximately 50 acres.

NEW JERSEY

NEWARK AIR SERVICE, operating at the Newark Municipal Airport, recently purchased the equipment of the Passenger Airways, including two OX-5 Curtiss Robins. This addition brings the number of Newark Air Service planes to eleven.

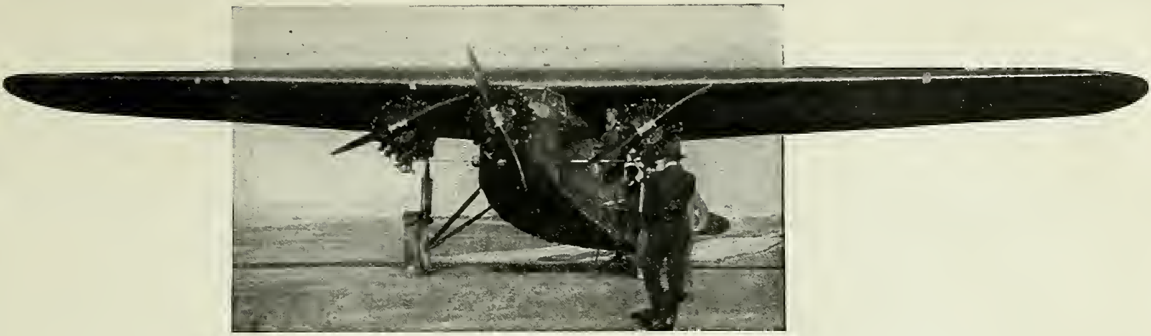
C. R. DANN, M. D. Baldwin and Lester Du Bois, executives of the Atlantic Air Service of Newark, traveled to Port Washington, Long Island, recently where they inspected the plant of the American Aeronautical Company, American builders of the Savoia-Marchetti amphibians and seaplanes.

C. D. Bowyer was appointed chief of operations of the Westfield airport, with supervision of all activities at the port by C. R. Dann, president of the Atlantic Air Services which operate the field.

CHARLES ENGELHARD, INC., of Newark, manufactures the Engelhard Heliummeter which is used on the Navy dirigible *Los Angeles*. This meter measures the dilution of helium gas caused by the constant diffusion of the gas through the containing walls and valves. The rate of diffusion determines the lifting force or the utility of the helium. The meter has a scale range of 100 per cent to 8 per cent.

ESSEX AIRPORT, INC., is an organization recently formed to establish and maintain a modern airport in Essex County, N. J., seven miles southwest of Paterson. It will offer airport facilities to the surrounding residential district. The tract, comprising more than 100 acres, lies at the juncture of Fairfield Road and Fairfield Avenue, in the Township of Fairfield.

(Continued on next page)



MICARTA
REG. U.S. PAT OFF.
PROPELLERS have no limitations

A MORE convincing test of strength and stamina could hardly be staged than the block test of Micarta propellers run by the Army Air Corps Engineering Division at Wright Field.

This test was run at more than 400 per cent input for ten hours, the Micarta propellers transmitting 800 hp. without a sign of failure or fatigue.

Performance of Micarta propellers during the flights to Australia and Hawaiian Islands, and on the endurance flight of the Question Mark is additional evidence of the high quality of these propellers.

Micarta propellers will not swell, warp, crack nor splinter. Moisture, salt spray and oil will not affect them. They are light in weight, quiet, vibrationless.

Your planes should be equipped with these modern propellers.

WESTINGHOUSE ELECTRIC & MANUFACTURING CO.
EAST PITTSBURGH PENNSYLVANIA
SALES OFFICES IN ALL PRINCIPAL CITIES OF THE UNITED STATES AND FOREIGN COUNTRIES

MICARTA W PROPELLER

Micarta is also made into:

- Pulleys
- Fairleads
- Hinge bearings
- Tailwheels
- Cabin-lining plate

Ask for descriptive matter.

Westinghouse

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Airport Lighting Equipment:

- Chromilite Landing Field Floodlights
- Boundary, Approach and Obstruction Lights
- Hangar Lights and Reflectors
- Transformers and Motor-Generators
- Mazda Lamps

Aerial view of the airport at Ithaca, New York.

(New Jersey News Continued)

The officers of the company are: Walter S. Marvin, president; George F. Hewitt, Jr., vice president; William Osgood Morgan, vice president; Adolph J. Lins, secretary and treasurer; Herbert E. Jefferson, assistant secretary and treasurer; and the directors are: Ralph H. Bollard, George F. Hewitt, Adolph J. Lins, Walter S. Marvin, William Osgood Morgan, Jansen Noyes, Roy E. Tomlinson, and James C. Willson.

CAPITALIZATION of the Atlantic Air Service, Inc., of Newark, was increased to $1,000,000 at a recent meeting of the directors of the firm. The organization plans a chain of flying schools and airports throughout the East.

Jersey City Airport

JERSEY CITY officially opened its airport on May 8th with a demonstration of flying given by military planes from Miller Field, Anacostia and Langley Field. Commercial planes from Newark Airport and other neighboring fields came over to pay their respects. The new airport is filled-in land situated on the shore of Newark Bay. Both seaplane and landplane landing facilities are now being prepared.

Construction has started on two hangars. The Jersey City Flying Club, which has been operating from the field for some time, will occupy one of them and use it as a combined hangar and clubhouse.

The factory of the Crescent Aircraft Co. adjoins the field. Clarence Chamberlin has been using the field for demonstration and testing of his planes.

Fred Lewis, vice president of Lewis and Valentine, has taken a long lease on the property and its development will be under his direction. C. S. Dionne, formerly manager of Newark airport, has been appointed manager of the Jersey City Airport.

THE New Jersey Aero Club of Hanover N. J., recently purchased a new OX-5 Eaglerock from the Sulzberger Aircraft Sales Corporation of Newark, N. J. This club has become the Eaglerock dealer for Morris County.

RHODE ISLAND

[THOMAS F. BRESNAHAN]

AN extensive airline passenger-carrying program for New England will be launched in June by the Curtiss Flying Service, Inc., of New England, according to plans announced at Pawtucket, R. I., by Maj. R. G. Ervin, New England manager.

Maj. Ervin visited the Rhode Island city to take over the What Cheer Airport, and in an interview outlined his plans for the summer. There will be a loop linking Pawtucket with Hartford, Springfield and Worcester, with planes flying both ways; an amphibian service between either Pawtucket or Newport and Block Island; a line between Nantucket and Newport, another between Newport and New York, via Southampton and Montauk and a line from Pawtucket to Hyannis.

The company is also seeking a seaplane base at Newport which will give it three units in Rhode Island. A school for 10- and 20-hour students will be established at the What Cheer field. Those who desire instruction of 100 or more hours will be handled at an advanced school to be established soon in a New England city.

THE Chamber of Commerce of Woonsocket has appointed a committee to seek the best site available for an airport. The Woonsocket high school has just established a course in aviation, and Congressman Jeremiah E. O'Connell has promised to get the Government to send a plane for the students to work on.

THE Rhode Island Model Airplane Association, one of the most active in New England, has arranged for two tournaments to be held at Providence on May 25 and June 1. The membership in the association has passed the 300 mark. These tournaments are to decide who will represent the state at the national contest in Detroit next month.

TWO cities in Rhode Island will be included as stopping places in the route to be traversed by airplanes of a new company to be known as the New York and Suburban Air Lines, which has been formed to operate lines from New York to outlying ports and shore resorts. Daniel H. Cox, president of the company, announced that the planes would stop at Watch Hill and Newport, R. I.

THE Shroeder bill applying the regulations of the Department of Commerce to aviation in Rhode Island passed both branches of the Rhode Island General Assembly during the closing sessions. The air traffic rules of the department are made a part of the state law.

THE New England Air Transport Company, recently formed to manufacture airplanes, with a factory at Hillsgrove, is negotiating with Armand J. Pothier for a lease of Pothier Field at Buttonwoods as a testing field.

Five planes are now nearly ready, the only thing holding them up being the delivery of the Gipsy engines with which they will be powered.

Kitty Hawk Approved Type Certificate

AFTER a period of development extending over nearly a year's time, the Bourdon Aircraft Corp., of Hillsgrove, Rhode Island, recently was granted Approved Type Certificate No. 134, from the Department of Commerce for the Kitty Hawk biplane.

The plane is a three-passenger open landplane, weighing only 1,142 pounds light, but with an approved load of 1,950 pounds. With the installation of controls in the forward cockpit, the plane becomes a suitable training and sport plane for two pilots. The seven-cylinder Siemens-Halske engine of 110 horsepower provides power. The wing spread is only 28 feet. The fuel capacity is 43 gallons, which permits protracted non-stop flights with full load up to 500 miles.

CONNECTICUT

[RUTH HUMMELL]

THE Hartford Aviation Commission is planning to fill in much of the land recently acquired which will double the present landing surface at Brainard Field. It is expected that the work will be consummated before the spring of 1930 and flying activities during the present season will not be hampered by this work.

A SERIES of conical chrome-yellow border lights, lately recommended by the Department of Commerce, have recently been installed at Brainard Field. This equipment completes the field's extensive lighting system, consisting of a 1000-Watt rotating airport beacon, eight 24-inch 1500-Watt floodlights and illuminated wind "T", 32 border lights 6.6 amperes series, obstacle and facade lights, and 180 degree B. B. T. triple reflector lights.

THE contract for the construction of a new administration building for the Connecticut Department of Aviation has recently been awarded by Captain Clarence M. Knox, State Aviation Commissioner, to Charles Smith & Sons of Derby.

(Continued on next page)

Pick a Winner!

WHETHER it's an entry in the Kentucky Derby, an entry in the Stock Exchange, or an airplane—you get a deal of satisfaction out of picking a winner.

If you're keen to own the fleetest ship, and the smartest ship, you'll want a Laird-Whirlwind. Look at the sleek black fuselage. Notice the poise of the wings, the careful stream-lining of struts and landing gear. Speed is apparent in every line!

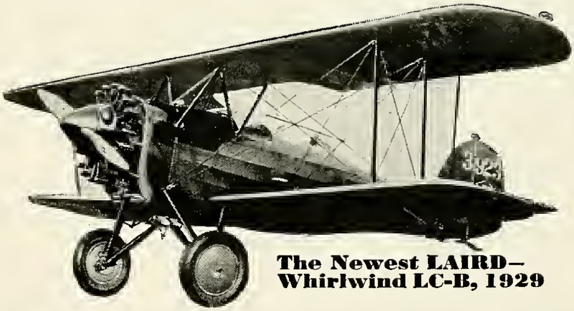
Then step into the roomy cock-pit, take the stick yourself, and put her through the jumps. You'll find that Laird performance bears out Laird appearance. As for stability—fly her "hands off" and see for yourself.

Laird superior design and Laird superior workmanship plus Wright Whirlwind power result in the perfected flying unit.

Laird airplanes are built for the sportsman-pilot and the commercial buyer whose chief interest is high efficiency and dependability rather than price. We invite such buyers to write for our free booklet and the name of the nearest distributor who can arrange a demonstration.

LAIRD CHICAGO.ILL. PLANES

Distributors: Exclusive territories available for established firms with funds and suitable demonstration facilities to handle LAIRD sales. Enlarged factory space and increased production facilities insure prompt delivery.



The Newest LAIRD—Whirlwind LC-B, 1929

E. M. LAIRD AIRPLANE COMPANY

Ashburn Field—4500 W. 83rd St., Chicago

Laird airplanes are manufactured only by the E. M. Laird Airplane Co., Chicago, Ill.

"THE THOROUGH-BRED OF THE AIRWAYS"

Danger that lurks in a FROZEN STICK is eliminated

By Design and Equipment the Whittelsey Avian is the finest plane in the world for training and sport.

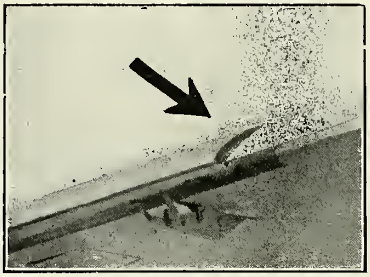
THE OUTSTANDING SPORT AND

AVRO AVIAN

IN ENGLAND

In the records it holds the Avian has a real claim to fame—England to Australia, first solo flight—longest flight in a light plane—fastest time England to India—longest solo flight ever made.

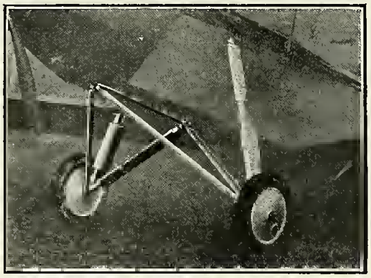
But this famous light plane has achieved its real record in training and club flying. Piloted by all types of flyers, flown through the varying climates of the earth, the Avian has justified the confidence of its builders. Years of air miles have set it apart as the safest, most enduring, most stable light plane in the world. Only such superlatives can describe the air-worthiness of this light plane.



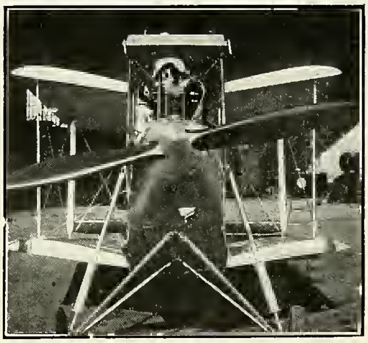
Safety is Added to Safety

Now the Avian, which by design boasts of a great margin of safety, has added to its equipment one of the outstanding achievements of modern aerodynamics—the Handley-Page wing slots.

The slotted wing accomplishes the following: Permits stalled turns without falling into a spin—enables ship to regain flying speed after stall with less loss of altitude than usual—materially improves lateral control by decreasing the counteracting yawing moment—decreases landing speed—practically eliminates possibility of ship going into spin in clouds or fog.



SAFER LANDINGS. Split-axle undercarriage with its unusually wide track, exceptional strength and greater resilience insures safer landings on rough ground. The Whittelsey Avian can be turned in its own length.



Designed for the sportsman too. The wings of the Whittelsey Avian can be folded by one person in a few moments. The telescopic jury struts, which must be placed in position before folding, are automatically slipped under the upper wings when not in use. With the wings folded, the Whittelsey Avian can be housed in a small shed.

For comfort in flight, for ease of maintenance and economy of operation, for manoeuverability in the air and on the ground, no other light plane can approach the Whittelsey Avian in performance. It is the plane that will contribute to the flying instructor's reputation as a safe pilot.

TRADE MARK
WHITTELSEY
AVIAN

IN AMERICA

SPECIFICATIONS

Power Plant: Cirrus Mark III, 95 H.P. air-cooled, four-cylinder in-line aircraft engine. Famous for economy of operation and maintenance. Top overhaul at 200 flying hours. *Economy of Operation:* 20 miles to gal. of gas—500 miles to gal. of oil — *Speed:* Maximum, 102 m.p.h.; cruising, 85 m.p.h.; landing, 35 m.p.h.; —*Ceiling:* 18,000 feet—*Cruising Range:* 5 hours or 430 miles—*Weight:* Light, 875 lbs.;—*Aerobatics:* 1450 lbs.;—Top, 1600 lbs.—*Dimensions:* Wings span, 28 ft., width folded, 9½ ft.—height overall: 8½ ft., length overall: 24 ft.—*Price:* Only $4995, Flyaway or F.O.B., Bridgeport, Conn.

MONEY TO BE MADE—Now we are proceeding with national distribution. Rich territories are still open to reputable dealers and distributors. For complete information concerning representation, sales plan and detailed story of this famous light plane, write the Whittelsey Mfg. Co., Dept. C-4. General Office and Plant, Bridgeport, Conn. (formerly the Whittelsey Body Co.)

TRAINING PLANE IN THE WORLD

(*Connecticut News continued*)

THE Connecticut State Department of Aviation is planning the purchase of a Wasp-powered Vought Corsair. The ship will be used in carrying inspectors about the state, as well as for travel purposes by the personnel of the Department.

THE Pratt and Whitney Aircraft Company of Hartford recently secured options on 500 acres of land in East Hartford upon which it plans to erect a new factory and a private airport, according to an announcement of F. B. Rentschler, president of the firm. The new plant will be designed to supply the increased demand for Wasp and Hornet engines.

According to present plans the new plant will be of single-story construction, containing about 500,000 square feet of floor space. Future plans for the flying field include sufficient hangar facilities and acreage to take care of test work on Pratt and Whitney engines and planes equipped with them. Albert Kahn, Inc., of Detroit, has been retained as the engineering firm to plan the proposed plant.

UNITED STATES DEPARTMENT OF COMMERCE approval certificates were given to five American Eagle plane models equipped with the new shock-absorber suspension known as the Rusco Friction Strut. This form of suspension is the design of Raymond E. Dowd, chief of the aeronautical engineering staff of the Russell Manufacturing Company of Middletown, Conn.

The principle used involves the use of brake-lining and elastic shock rings working in unison to provide, in addition to the usual elastic suspension, a variable friction control of recoil and landing shocks.

A BRANCH office of the Russell Manufacturing Co., of Middletown, Conn., was opened recently in Dallas, Texas. From this branch office the states of Arkansas, Colorado, Kansas, Missouri, Oklahoma and Texas will be served with Rusco automotive and aeronautic products and belting. C. H. Nugent will be the division manager in charge of this branch.

NEW ENGLAND

GEORGE H. WATKINS of Cambridge, Mass., and Neil E. Buckley of Tacoma, Wash., have joined the Massachusetts Airways Corporation of Springfield, Mass., as instructors in the company's school.

THE Worcester *Telegram-Gazette* of Worcester, Mass., has started an aviation column covering local aeronautical activities. The column appears on Sundays and Thursdays.

THE Moth Aircraft Corporation reports two new distributors: Col. H. C. Fry of Pittsburgh, for western Pennsylvania, and Air Service, Inc., of Johnstown, for central Pennsylvania. Because of the large volume of orders on hand, immediate steps are being taken to increase production from 4 planes a week to more than 10 a week.

RICHARD F. HOYT was elected to the board of directors of the Moth Aircraft Corporation of Lowell, Mass., at a recent meeting of that body.

TRANSCONTINENTAL Air Transport has recently ordered fifteen Wasp engines from the Pratt and Whitney Aircraft Company of Hartford, Conn., to be used as spare parts, according to an announcement of the Pratt and Whitney concern. The engines are to take care of the operation of the T. A. T. fleet of trimotored Ford ships.

WETMORE-SAVAGE AIRCRAFT, INC., of Boston, is now distributor for the Arrow Sport, through the East Coast Aircraft Corporation, for all of the New England states.

WASHINGTON, D. C.

[Wing Over]

POTOMAC FLYING SERVICE, INC., now has three Whirlwind-powered New Standards and expects delivery of a fourth. It is stated by General Manager John Wynne that, with the new arrangement for loading passengers, the four ships will be able to carry as many as 800 passengers a day. Captain Ira Eaker perfected the loading system, which consists of two roped-off walks with a concrete tarmac at each end. The two walks radiate from the waiting room at a ninety-degree angle, while the point in the center directly opposite the waiting room is reserved for visiting ships, of which there are many at Hoover Field.

Messrs. Sullivan and Fisher, sales engineer and chief pilot, respectively, for Aeromarine-Klemm, spent several days at Hoover Field during May demonstrating the little Salmson 40 horsepower Klemm, which resulted in an order from Potomac Flying Service for five of them. These will be used for instruction and rental purposes to qualified pilots. The company will act as distributor for the Aeromarine-Klemm.

MR. PAULETTE, Capt. Jesse W. Lankford's assistant in the Licensing Section, went solo at Washington airport on May 14. Soon everyone in the Aeronautics Branch will be a bona fide pilot.

LEIGHTON W. ROGERS, chief of the Aeronautics and Communications Section. Department of Commerce, is expanding the trade promotion activities of the section in order to take care of the increased interest of the industry in trade matters. Brower V. York handles the foreign transportation phase of the work, and Fowler W. Barker, formerly of the R. F. C., and a present transport pilot, handles the merchandising end of the section's activity. Courts D. Rea, ex-Vice Consul at Paris who was on the staff of the International Aeronautics Conference, assists in making trade surveys for the aeronautical industry. Mr. Rogers recently received the Legion of Honor from the French government for his work in promoting relations between the aeronautic industry of this country and France.

RESERVE CAPTAIN HOWARD NORRIS has resigned as manager of Washington Airport and is succeeded by Mr. Rabbit, formerly connected with the company in a less conspicuous capacity. Donald Stuart is now chief pilot and makes most of the flights to Newark and back on the Washington-New York Air Line route. Stuart says that his company has several Lockheeds on order, which when delivered will make possible a 90-minute trip to Newark as compared with an hour and 40 minutes with the present equipment.

MR. MARIOT, chief of the Department of Commerce School Section, is busy with requests for ratings from schools all over the country.

CAPTAIN IRA EAKER carried over 100 passengers in the Loening amphibion on the first day of operation from the floating dock at Hains Point, just opposite the Naval Air Station.

WHEN Pitcairn started the double service to New York this month, many dignitaries from the Government were on hand. Later in the month Mr. Pitcairn flew into Bolling Field in the autogiro en route to Langley Field for the annual N. A. C. A. get-together.

A. PENDLETON TALIFERRO had an appendicitis operation and is just back at his desk as chief of the airport division of the Aeronautics Branch. His assistant, John E. Sommers, has been working night and day writing letters of technical advice to airport builders. Sommers and Taliferro were both Navy pilots. The latter has the Navy Distinguished Flying Cross for work in Italy during the war.

THERE is nothing new to report on the airport situation. Colonel Lindbergh appeared before the Senate Committee in May, and offered some good suggestions in regard to location and size, but nothing has materialized in the way of even a start in getting a field under way.

THE Navy pilots have been busy testing the Consolidated seaplane, the Curtiss two-seater fighter, and the Curtiss Fledgling. There is also a pontoon-equipped Keystone Pup and a Fleet Husky Jr., for the Navy to play around in. Lieut. Soucek's Wasp-powered Wright Apache, which holds the world's altitude record, is always the center of interest at the Anacostia Naval Air Station.

H. B. HENRICKSON of the Bureau of Standards has designed a new airplane thermometer which automatically records the minimum temperature through which an airplane passes. The new instrument makes use of a bimetal strip, and is mounted on one of the struts of the plane. It is light in weight and several can be used to determine temperatures at various points on the airplane if desired.

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UNI-ROK meets, in fact exceeds, every requirement of the **Department of Commerce** and continues to merit the approval of the **Federal Government.**

Write or wire our Airport Division for further information, or if so desired, our special Airport Representative will interview you on request without obligation.

UNITED ROCK ASPHALT SALES COMPANY
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ALABAMA

[ROBERT H. BROWN]

THE South is working overtime trying to get a new transcontinental line passing over the southern part of the country. Cities interested in the project are Montgomery and Selma, Ala.; Washington, Richmond, Raleigh, Columbia, Augusta and Macon, Ga.; Jackson, Meridian, and Vicksburg, Miss.; Monroe, La.; Dallas, Fort Worth, Tex., and Los Angeles.

The nucleus, according to tentative plans, will be at Montgomery, where an airplane factory to manufacture ships will also be built.

Plans are to be completed soon for the formation of a corporation to operate this transcontinental line, carrying passengers, mail, and express.

INCORPORATION papers have been filed by the Birmingham Passenger Airways, Inc., to be operated by D. B. McCracken, Walter Wise, and A. L. Warren, of Roberts Field, Birmingham.

A SUITABLE site for a new municipal airport at Birmingham has been selected by the Ensley Real Estate Board which plans to take the matter up with city officials. The present field, Roberts Field, is far too small.

CONSTRUCTION of the hangar to be used by the Montgomery School of Aeronautics at Montgomery's new municipal airport is nearing completion. A new American Eagle plane, powered with a Kinner engine, has been delivered to L. C. Mason, of the Montgomery School of Aeronautics. The school is state distributor for the ships.

MAYNOR FIELD, at Tuscaloosa, Ala., has been enlarged and now contains 100 acres.

GEORGIA

[AL MAJOR]

CANDLER FIELD, Atlanta's municipal airport, was recently purchased by the city from the Candler family. The tract comprises 300 acres which have been used under an option agreement with Asa Candler, Inc. The cost to the City of Atlanta is $94,500. Mayor I. N. Ragsdale appeared personally before the council and urged the purchase of the airport, stating that the Candler family had agreed to a reduction of $5,500 from the original price, this amount representing 5½ per cent of the principal which was allowed in the form of a discount. Funds for the purchase of Candler Field were obtained from the sale of several parcels of land owned by the city. Clarke Donaldson, chief of the city construction department, recently completed surveys at the field so that all improvements could go forward immediately, and actual work has started on increasing the east and west runway to 2,700 feet.

Pitcairn Aviation, Inc., recently announced that it would start construction immediately on a new hangar for its trimotored ships, to be used on the passenger line to New York.

The Atlanta Aircraft Corp. recently leased a four-acre tract at Candler Field and will start immediately on the construction of the first unit of its plant, a $25,000 structure. This corporation is headed by George Prudden, former chief engineer for the Stout Metal Airplane Co., division of the Ford Motor Company, and more recently of the Prudden Metal Aircraft Co. of San Diego, Calif. The Atlanta company will build small all-metal trimotored monoplanes.

THE unification of all aviation organizations in Atlanta for a concentrated promotion of aviation was recently affected by members of the Atlanta chapter of the National Aeronautic Association which held a reorganization meeting and election of officers and directors as follows: C. F. Dieter, president; T. Edward Moodie, vice president; R. L. Fleet, secretary; N. Baxter Maddox, treasurer, and the following directors: Beeler Blevins, G. C. Bowden, Prof. C. E. Cooledge, Milton Dargan, Jr., Douglas Davis, Jesse Draper, Henderson Hallman, Wm. B. Hartsfield, Dr. Herbert B. Kennedy, E. K. Large, Al Major, Harry O. Mitchell, L. K. Morrison, Stanford E. Moses, John K. Ottley, Jr., Geo. H. Prudden, and D. Mackay Solenberger.

SOUTHERN AIR TRANSPORT, INC., recently bought out the Douglas Davis Flying Services and retained Mr. Davis as general manager in Atlanta. This corporation has now been absorbed by the Aviation Corporation, one of the largest air combines in the United States.

THE Southern Airways Association recently laid before Assistant Postmaster General W. Irving Glover a proposed southern transcontinental air route which would carry mail, passengers and express from Washington to Los Angeles. The airways association suggested a route which would take in the cities of Richmond, Va.; Raleigh, N. C.; Columbia, S. C.; Augusta, Macon and Columbus, Ga.; Montgomery and Selma, Ala.; Jackson, Meridian, and Vicksburg, Miss.; Monroe and Shreveport, La.; Dallas and Fort Worth, Texas, with an eventual extension to Los Angeles.

ON May 31-June 2, Macon will celebrate the lighting of Miller Field, its municipal airport, with a show to be known as the Southeastern Aeronautical Exposition. It will be sponsored by the Macon Junior Chamber of Commerce and will include a model airplane contest for boys under 18 years of age for which there are cash prizes of $100 together with plane rides. The program will include races, stunts, exhibition of new models and equipment, and night flying.

MILLEDGEVILLE, Georgia, will have an aviation field at the fair grounds of the Middle Georgia Fair Association, according to a recent decision of the board of directors of the association. Thirty acres of land will be added for the project.

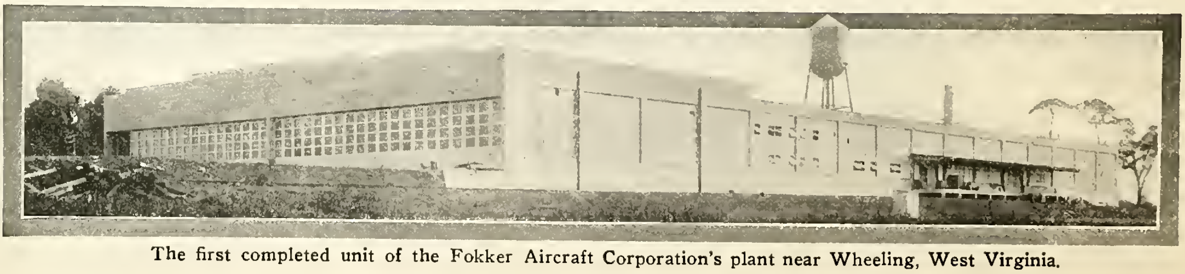
The field will be used as a municipal airport, and the city of Milledgeville will be asked to install a beacon light and give other assistance in the development of the project.

[LIEUT. F. E. DAVENPORT]

WHILE final plans are being completed for the erection of a $150,000 hangar air terminal at Atlanta airport by the Pitcairn officials, they are considering the inauguration of passenger plane service from Atlanta to points in Florida. The plans for the new hangar-administration building call for a structure 100 by 120 feet. Besides storage space for a fleet of ships, the building will include a complete repair shop, a passenger waiting room and observation balcony, quarters for pilots and offices for line officials. The hangar will be headquarters for maintenance and repair of all New York-Miami mail planes as well as the Ford cabin monoplanes used in passenger service.

A SUPPLEMENTARY landing field in the heart of Atlanta was proposed recently by Lee Smith, president of the New York Building Owners and Managers Association. The plan as outlined would be to erect a concrete landing area over the railroad tracks and contact with the Spring St. Viaduct. It is believed that the railroads will coöperate with this project, which has been warmly indorsed by leading business men of the city.

(*Continued on next page*)



The first completed unit of the Fokker Aircraft Corporation's plant near Wheeling, West Virginia.

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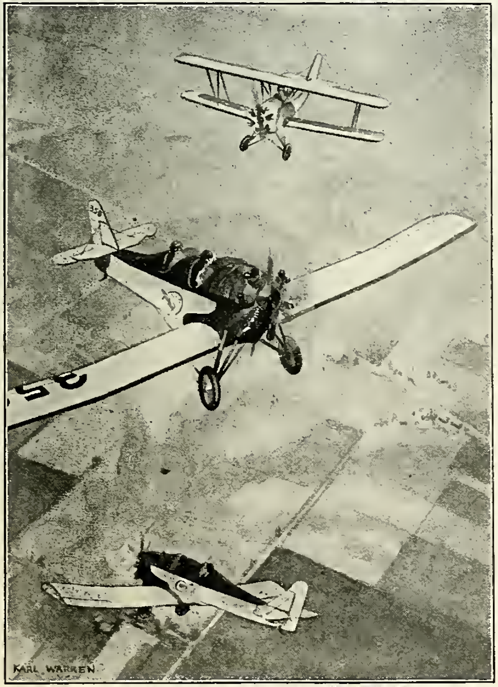

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(Georgia News continued)

ON May 8th, a new aeronautical body was launched in Atlanta, when the Capitol City Flying Club was organized with 25 active members. The club is planning the immediate purchase of a plane, the arrival of which will start an elaborate system of instruction in the many phases of aviation.

Charles M. Ford, Jr., president of the club, has been appointed Georgia sub-dealer for the Alexander Eaglerock. E. W. Williams of Greenville, S. C., president of Williams Flying Service, is dealer for Georgia and South Carolina, and Al Major, of Atlanta, is Eaglerock dealer for Alabama.

FLORIDA

[Johnson Wright]

THE State Legislature, now in session, has several bills before it pertaining to aviation. One bill is known as the Florida air navigation act. It requires of all pilots a Department of Commerce license and makes most of the Federal laws pertaining to air navigation effective within the state.

The second bill is the more interesting. Florida has one of the finest systems of state highways in the United States. The bill would have the State Road Department widen the shoulders of the highways, at regular intervals, sufficiently to make the total width of the shoulders and the highway 150 to 200 feet for a distance of 1,500 feet. The plan is to designate these places as emergency landing fields to be used by planes flying in those sectors.

At the time of this writing, the legislature has just passed a bill authorizing municipal corporations to secure and operate airports within or without the limits of the municipality. It also provides for the acquisition of land needed for airport purposes by purchase or condemnation. The cities are also authorized to issue municipal bonds for purchasing the land where necessary.

THE Arcadia Aero Club was organized recently. L. R. Morgan is president; E. D. Treadwell, Jr., secretary; and William Seward, treasurer. The club will have charge of the dedication of the new Arcadia airport, scheduled for July 4th.

The airport is about two miles east of the city on the cross-state highway. Construction of a small hangar and fueling facilities has been completed.

THE Airways Transport, Inc., of Fort Myers, will provide planes for spotting and reporting forest fires in that section.

A LARGE plot of land adjoining the present airport has been donated to Plant City and will be used for enlarging the airport.

A LARGE eight-place cabin monoplane powered with a Liberty 400 horsepower motor has been built and successfully test flown by the McMullen Aircraft Corporation of Tampa. Among the test flights made by Capt. McMullen was one to Chicago and return. The big ship has a wing span of 46 feet 6 inches, and in tests, developed a high speed of 140 miles per hour and a landing speed of 48.

The McMullen Aircraft Corporation has expanded rapidly during the past year. There are now six departments of the business as follows: theoretical and technical under Owen H. Pinaire; airplane service on the field under Tony Pitisci; motor maintenance under H. A. Strickland; business administration under Ernest Hensley, and the new public relations department under W. G. Stewart. Capt. A. B. McMullen is president and general manager of the company.

CHARLES T. BLACKBURN, formerly a commander in the United States Navy, has been employed by the Tampa Chamber of Commerce to head its new aviation bureau.

GROUND has been cleared for an airport at Lake Wales. Runways are being prepared and will soon be ready for use.

A SMALL monoplane powered with a modified motorcycle engine built by Paul B. Moore, a Miami student aviator, is said to have successfully completed its initial test flight. The little ship was built in the shops of the Moore Aero Supply Co. of Miami.

(Continued on next page)

JOE LEWIS
California Distributor

The Arrow Sport

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1911

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A variety of courses are offered in all Universal Aviation Schools. Flying Courses prepare the student for government examination, for Private, Limited-Commercial or Transport licenses. An Aviation Mechanic's Course prepares a student to become a licensed aviation apprentice mechanic. A Business Course offers the man with experience in other fields an opportunity to learn the principles underlying aviation activities so he may enter the administrative end of this fast growing industry.

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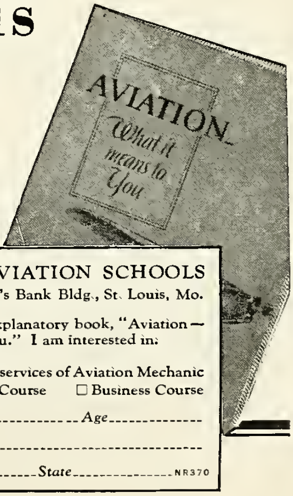

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(Florida News continued)

THE Miami Aero Club organized early this year has made splendid progress. The membership of the club is now nearly 100. Included in the membership are Glenn Curtiss, Alden Freeman, R. I. Dunten, Senator Hiram Bingham and many others prominent in aviation.

Within the club has been organized Flight Squadron No. 1 composed of about 35 members. Irving W. Stone, a former Army pilot, is instructor for the squadron.

DURING the first three months of 1929, Pan American Airways transported 3,254 passengers and 100,084 pounds of mail over its international air routes to Nassau, Cuba and the West Indies islands. During this period and up to the time of this writing, the company attained the highest rated efficiency of any operator under contract with the Post Office Department, the rating being 100. Not a scheduled trip was cancelled or broken. In addition to the regular trips scheduled, many special ones have been made, for it has been impossible to handle the large volume of business in the scheduled planes alone.

A 25 per cent reduction in round trip fares was made effective May 1 by James M. Eaton, general traffic manager of Pan American Airways, Inc. This reduction in fare, to accommodate the summer tourists to the West Indies, will continue until November 1st.

PLANS for an 80-hour transport service for both mail and passengers between the United States and Buenos Aires, 24-hour service to the Panama Canal Zone, and a 50-and 60-hour service to Peru and Chile, were announced recently by J. T. Trippe, president and general manager of Pan American Airways, Inc. The new fast schedules envisage the installation of additional landing fields, adequate radio equipment, and facilities for night flying.

THE airport at Arcadia is being improved and made to conform to Department of Commerce requirements. A hangar is also being constructed by William Seward. Present plans call for the dedication of the airport on July 4th.

AN assembly plant of the Stutz Bellanca Aircraft Corporation will be located in Florida, probably at Orlando, according to an announcement by Harry C. Stutz, former president of the Stutz Motor Co. and president of the new company. Airplanes and engines will be built by the new company. Engines will be manufactured in Bridgeport, Conn., in the plant of the Commercial Aircraft Company, which the Stutz Bellanca Company has taken over. They will then be shipped to the assembling plant in Florida, where all assembling of planes will be done. The types of planes designed for production include small planes for personal use and large multi-engined craft.

MARYLAND

[EDWARD JOHNS]

BALTIMORE'S municipal airport is under construction. The port is to be built in three units, the most southerly of which will be constructed first. It will contain nearly 1,000 acres and have complete equipment, with a ship channel leading alongside that will allow the large aircraft carriers to tie up beside the field. The cost will reach nearly $4,500,000.

THE Curtiss Flying Service, Inc., has purchased the rights of the Chesapeake Aircraft Company, operating from Logan Field. There was no change in the personnel. The equipment of the unit now includes Curtiss Robins in addition to the Travel Airs, Fairchilds and Monocoupes already there.

NATIONAL GUARD fliers of the 104th Observation Squadron have taken up their summer activities at Logan Field. In the absence of Major W. D. Tipton, who has been in Florida, Capt. Charles A. Masson was in command.

COL. JOHN A. HAMBLETON, vice president of the Pan American Airways, addressed the sixteenth National Foreign Trade Convention that met recently in the Lord Baltimore Hotel, Baltimore. This is

(Continued on next page)

CONSTRUCTION
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METAL AIRPLANES INCORPORATING
DESIGN FEATURES OF THE BURNELLI TYPE

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In the aircraft industry, more than in any other, are all of these advantages essential. Butler Ready-Made Steel Hangars have functioned extensively in the rapid development of airports.

Sizes range from the individual type for sheltering privately owned ships to the enormous airport types which are familiar landmarks at many landing fields. Air stations for transport lines, training quarters at flying schools, plant buildings for aircraft factories and warehouses for ground equipment and materials are other purposes in the aircraft industry which various types of Butler Ready-Made Steel Buildings serve.

Butler engineering service will supply you with all the detailed information you need to make a selection to fulfill your requirements — including prices, if you will mention the size building in mind. The large Fairfax Field Hangar pictured below has a clear span of 80 feet.

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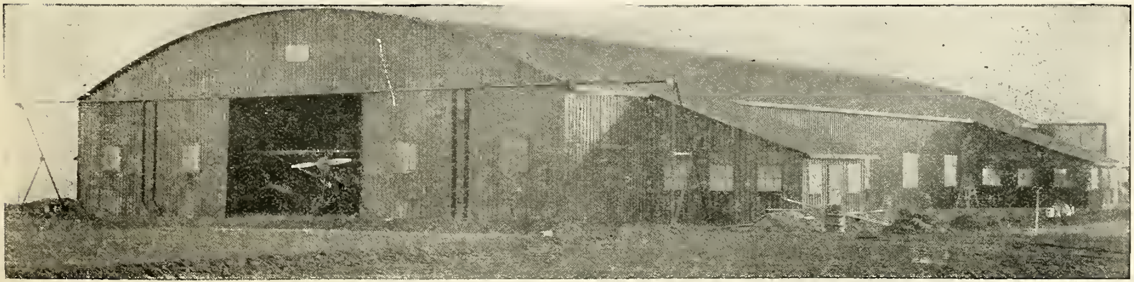

(Maryland News continued)

one of the most important of trade conferences, and attracted 1,800 business executives from the United States and eighteen foreign nations.

An interesting view on aviation was given by Senor Don Carlos G. Davila, Chilean Ambassador to the United States, who attended the trade sessions and who is an aviation enthusiast.

WITH appropriate ceremonies attended by several thousand persons, the cornerstone of the new factory of the Berliner-Joyce Aircraft Corporation, at Baltimore, Md., was laid Saturday afternoon, May 4. The affair brought many prominent officials of the War, Navy and Commerce Departments and civil representatives. The Governor of Maryland, the mayor of Baltimore, and representatives of military and civil aeronautics spoke of the future of the industry in Baltimore and of the Berliner-Joyce corporation in particular.

The new building of brick, steel and concrete, is situated about eight miles from the heart of the city, adjacent to Logan field. The building was erected in record time by the contractors, the M. A. Long Company of Baltimore. A flying field at one side of the factory will permit flying away of completed land airplanes and the projected seaplane base, which will adjoin the property, promises to be one of the most accessible bases in that region. The municipal flying field will connect directly with the Berliner-Joyce field. Good transit and shipping facilities already exist, and the position of the factory and field directly on the New York-Washington air route, as well as the probable use of the municipal field as the Eastern terminal of an important transcontinental airline, gives the company an unusually fine geographical location.

A wind tunnel, designed to be one of the most modern of its type, has been developed by Mr. Wm. Miller and will soon be ready for installation.

E. B. (Tex) Anding, who has been flying crop dusting planes in Peru with Lieut. Harold Harris, recently arrived at Logan Field to join the engineering staff of the Berliner-Joyce Aircraft Corp.

BALTIMORE is included in the air mail service from Washington, D. C., to New York City which connects with the new double transcontinental service. The plane leaving New York at 5 a.m. reaches Baltimore at 6:40 a.m. Northbound, the plane leaving Washington at 6:45 p.m. leaves Baltimore at 7:15 p.m., arriving at New York at 9 p.m.

HAGERSTOWN

[John C. Middlekauff]

THE Challenger C-4 Comet has been put into production by the Kreider-Reisner Aircraft Corp. There are 250 men now employed at the Challenger factory, and by the first of July the number will be raised to 500. At present the plant is operating day and night.

The following officers have been elected by the Challenger Flying Service: Lewis Reisner, president; Leo Miller, vice president; J. D. Baker, secretary-treasurer. L. Reisner, J. D. Baker and J. H. Smith form the board of directors.

The new administration building of the Kreider-Reisner Aircraft Corp. was to be completed by the end of May. The new unit of the factory which is now nearing completion is 120 feet by 260 feet. This will give the corporation a total of 82,000 square feet of floor space. The building, which is made of brick and steel, is fireproof and embodies all the latest improvements in aircraft buildings. The plant is to be in operation by July first with an output of four planes per day. The line production method will be used. The working conditions are to be on a high standard, and the danger of accidents will be lessened by the use of daylight instead of indirect lighting.

CAPT. ALEXANDER of California has been added to the staff of pilots of the Challenger Flying Service.

THE Ninth Annual Flying Show of the Baltimore Flying Club and the 29th Aviation Division, Maryland National Guards, was held May 30. The air services of the Army, Navy, Marines and National Guards were invited to participate.

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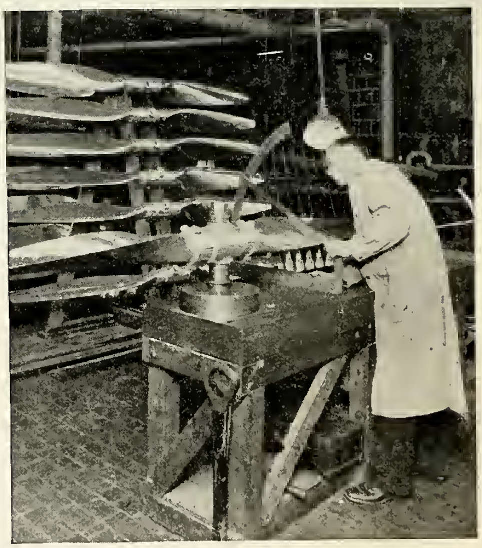
The reputation for Hamilton accuracy has spread to all corners of the earth. Wherever planes fly you will see the trademark of Hamilton on the glistening blade. Hamilton propellers are made in both wood and metal . . . with spinner or without . . . but each one, though it varies in outward appearance, has behind it a similarity of workmanship . . . and a name that is a beacon in the development of American aviation.

Ask for detailed information on the new Hamilton "Speed-Test."



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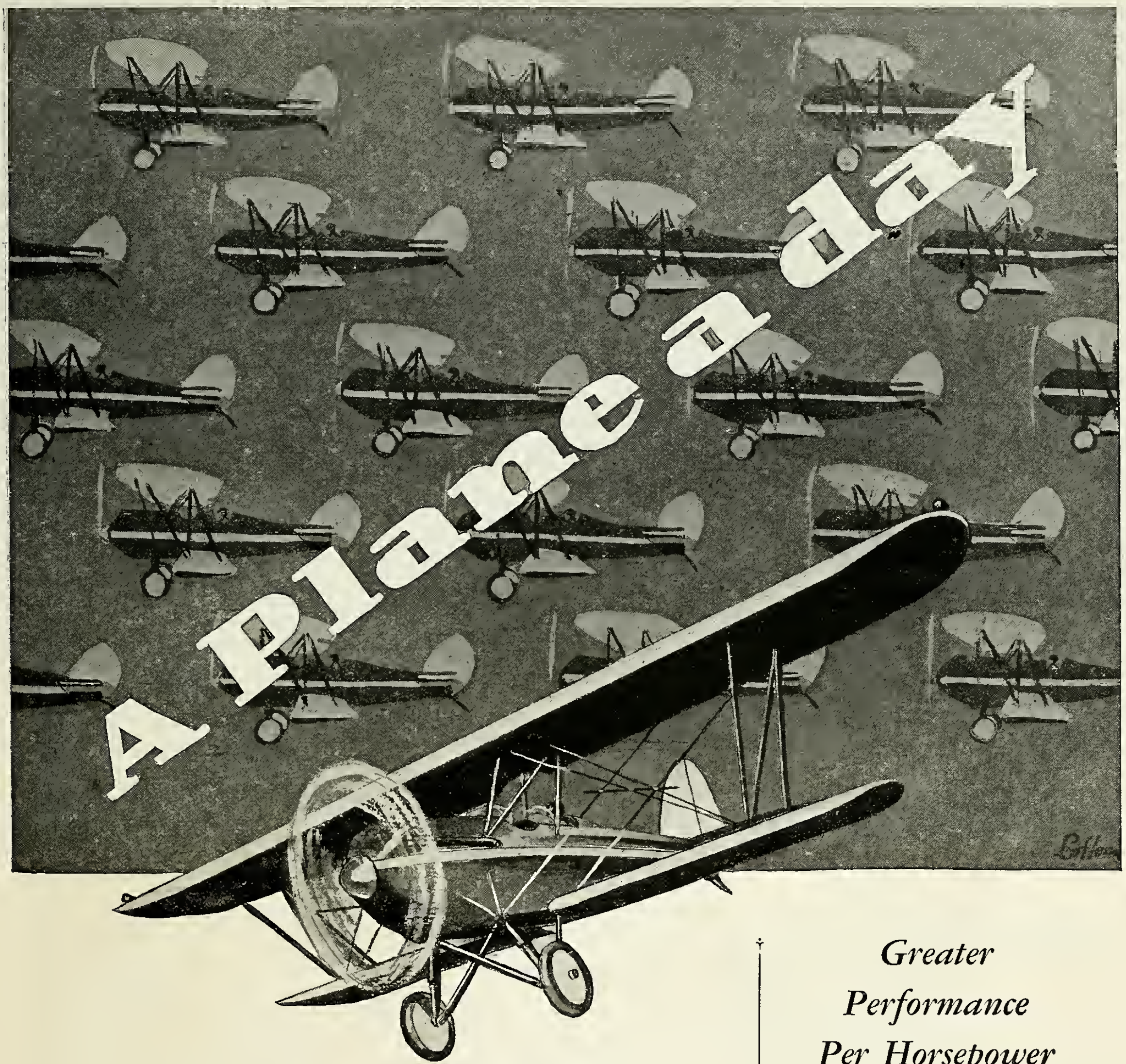
PACIFIC COAST BRANCH—GRAND CENTRAL AIR TERMINAL, GLENDALE, CALIFORNIA



ONE BIRD A DAY . . . a production schedule assuring dealers prompt delivery . . . adds to BIRD leadership in the popular priced class which sound design and practically tested performance have already established.

Dealers' franchises for this plane are still available in some territories.

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Brunner-Winkle Aircraft Corporation

Haverkamp St. Glendale, Brooklyn, N. Y.

Greater Performance Per Horsepower

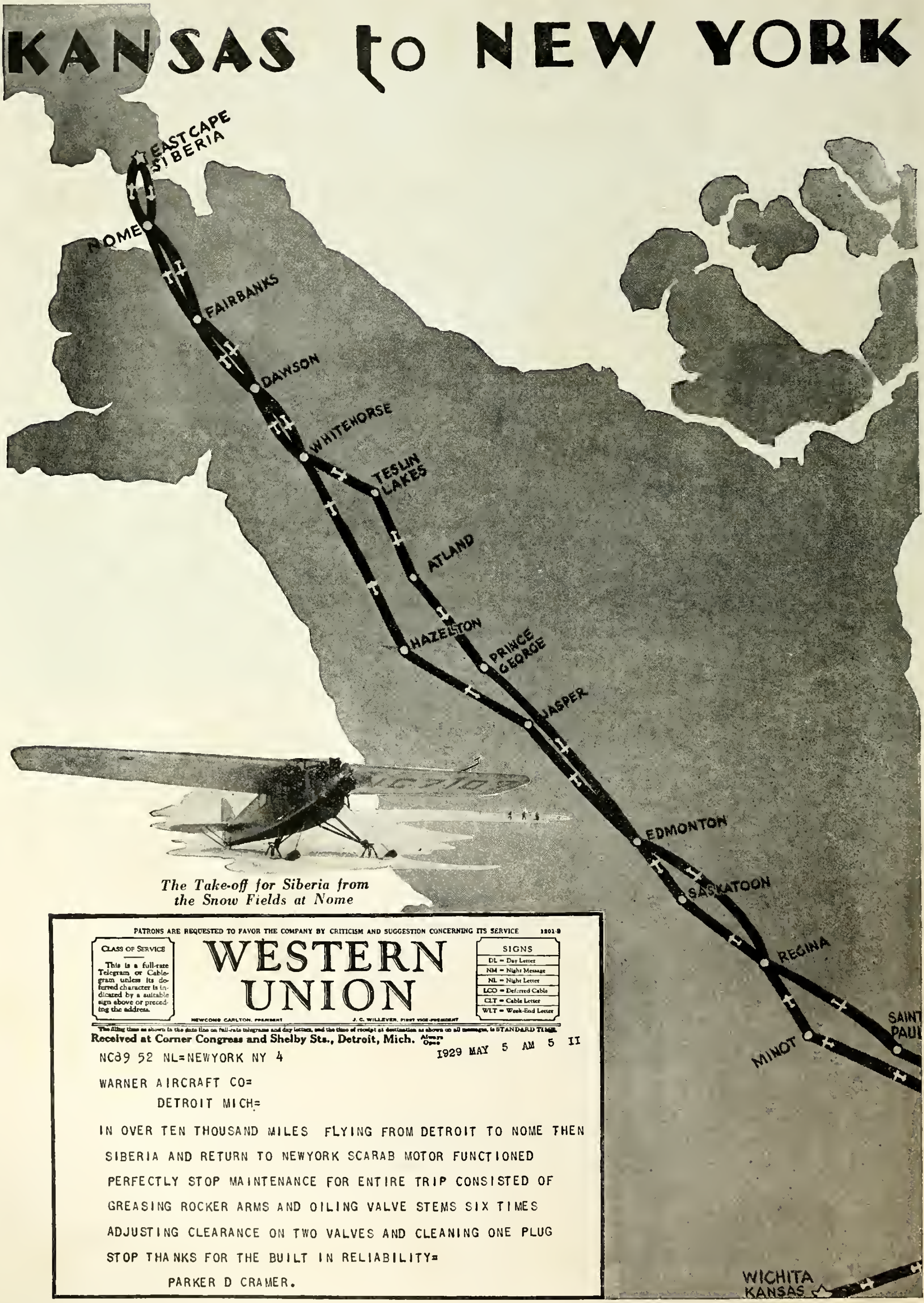
—the keynote of BIRD leadership

Performance data with Curtiss OX-5

High Speed	120 M. P. H.
Landing Speed	35 M. P. H.
Cruising Speed	100 M. P. H.
Gas Consumption at 100 M. P. H.	5 gal. per Hr.
Take Off Run	100 Feet
Rate of Climb	1,000 F. P. M.
Absolute Ceiling	20,000 Feet
Endurance at Cruising Speed	9 Hours

NO FIELD TOO SMALL . . .
NO TREE TOO TALL

KANSAS to NEW YORK



The Take-off for Siberia from the Snow Fields at Nome

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WARNER AIRCRAFT CO=
DETROIT MICH=

IN OVER TEN THOUSAND MILES FLYING FROM DETROIT TO NOME THEN SIBERIA AND RETURN TO NEWYORK SCARAB MOTOR FUNCTIONED PERFECTLY STOP MAINTENANCE FOR ENTIRE TRIP CONSISTED OF GREASING ROCKER ARMS AND OILING VALVE STEMS SIX TIMES ADJUSTING CLEARANCE ON TWO VALVES AND CLEANING ONE PLUG STOP THANKS FOR THE BUILT IN RELIABILITY=

PARKER D CRAMER.

VIA SIBERIA

10,000-mile amazing WARNER-SCARAB *performance*

Arrival at Nome April 23, 1929

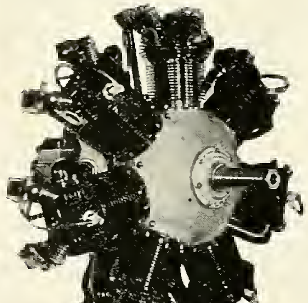
ONE month ago to the day, on which he left Detroit, Parker D. Cramer was again in that city after the amazing 10,000-mile flight of his Warner-Scarab to Siberia.

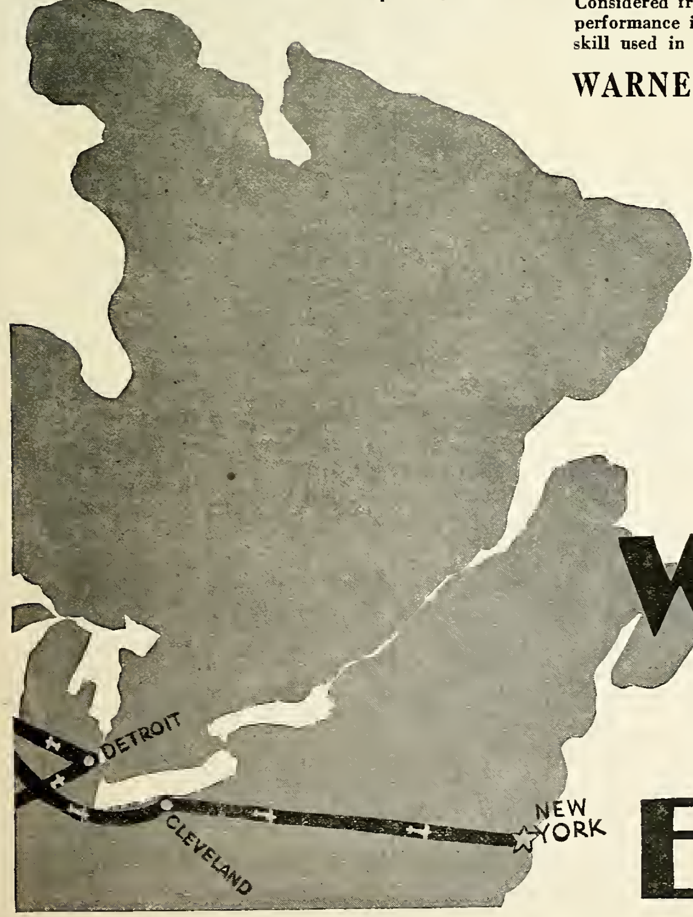
Using the same plane and the same engine (No. 26) with which Earl Rowland won the New York to Los Angeles Air Derby last September, and flying 1400 miles a day when necessary, Cramer made the trip in 118 flying hours with only the slight adjustments to the engine mentioned in the telegram herein reproduced. And the return flight, Nome to New York, was made in 46 hours' flying time.

During the flight all climatic conditions were encountered, beginning with the almost mid-summer temperature in Kansas, the starting point, through the balmy spring air of Alberta, and into the zero weather of Alaska and Siberia.

Considered from every viewpoint this most recent Warner-Scarab performance is a magnificent tribute to the painstaking care and skill used in the engine's production.

WARNER AIRCRAFT CORPORATION
DETROIT, MICHIGAN





WARNER
THE Scarab
ENGINES

KENTUCKY

[A. W. WILLIAMS]

THERE has been a great deal of flying at Bowman Field, Louisville, recently as a result of the spring races and the Kentucky Derby on May 18. A traveling representative for Curtiss Flying Service was authority for the statement that every plane in Curtiss service within a radius of 500 miles of Louisville had been chartered for a trip to Louisville for the Derby.

IMPROVEMENTS are being made rapidly at Bowman Field, where the new administration building of the Louisville and Jefferson County Air Board is coming along nicely, and will be completed about July 1. Location for an oil and gas service station to be operated by the Standard Oil Company of Kentucky has been re-allocated.

There are now a total of about twenty-seven planes making Bowman Field their home port. The National Aviation School, operated in coöperation with Curtiss Flying Service, now has about fifteen students enrolled.

It is understood that Curtiss Flying Service has arranged to make Louisville a storage point for planes over the Kentucky-Tennessee territory, and will remodel a tobacco warehouse building for this purpose.

THE Louisville and Jefferson County Air Board, according to President Addison Lee, is endeavoring to get new roads into Bowman Field to provide more parking space. Fences are to be erected to facilitate the policing work by keeping the crowds back from the flying area.

One of the new ideas that Curtiss is working out at Louisville is in connection with special excursions or tours to points of interest in the state. The four or five principal points include Mammoth Cave, in Western Kentucky; Lincoln Farm, near Hodgenville; Jefferson Davis Monument, near Hopkinsville; the Old Kentucky Home, at Bardstown; and the Dix River Power Dam, near Danville.

One thing that has been an aid to development of aviation about Louisville has been the fact that there have been no serious accidents in a long time. For one thing Captain Galloway is very strict about any stunting over the field and his precautions will go a long way toward preventing avoidable accidents.

LIEUT. JAMES A. ELLISON, former commanding officer at Bowman Field, Louisville, who was succeeded here by Captain Galloway, is now located at Selfridge Field, Mount Clemens, Mich. Ellison was mighty popular in Louisville, where he did much for the development of flying and made many friends.

L. S. VANCE was elected president of the Aero Club of Kentucky to succeed Addison W. Lee. Other officers are vice president, John Russ; secretary-treasurer, W. Sidney Park; and directors, Capt. F. E. Galloway, Commanding Government officer at the field; H. L. Gentry, Norton Goldsmith, Henry Hesse, Mr. Lee and A. L. Near. The club is affiliated with the National Aeronautic Association.

AT Hopkinsville, Ky., the Hopkinsville Airport Committee has been formed for the purpose of selecting a larger and better field than Renshaw Field. This committee is composed of Ed. L. Weathers, Edgar Renshaw, and S. L. Cowherd.

ARTHUR J. DALY, assistant city solicitor of Newport, Ky., recently announced the purchase of 20 acres of land at Ross, Ky., four miles from [illegible] The acreage is being put in shape, and will be known as Boyers' Airport.

GOV. FLEM D. SAMPSON, of Kentucky has named A. W. Williams, AERO DIGEST correspondent, as an aid on his staff, with the rank of colonel, in recognition of some fifteen years service in the trade press field, much of which has been devoted to the progress of Kentucky, in industrial, commercial, agricultural and technical publications of one kind or another.

[JOHN WALKER ROGERS]

A CAMPAIGN to have all the towns in Kentucky air marked was launched in Frankfort, the state capital, when Governor Flem Sampson painted the word "Frankfort" on the roof of the tallest building in the capital city. Representatives from sur-

(*Continued on next page*)

Custom-built Aircraft

.....*by Cruban*

NOW . . . . an entire engineering organization is prepared to handle the construction of specially designed aircraft to meet your requirements. Our service is complete—from original design, through engineering and stress analysis, to final construction and flight tests.

The advice of our consulting engineers is available, without obligation, to interested parties.

CRUBAN MACHINE AND STEEL CORP.
Aeronautical Division
54 Varick Street, New York City
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Special airplane parts made to specifications for aircraft designers.
New ideas developed.

ENGINEERS

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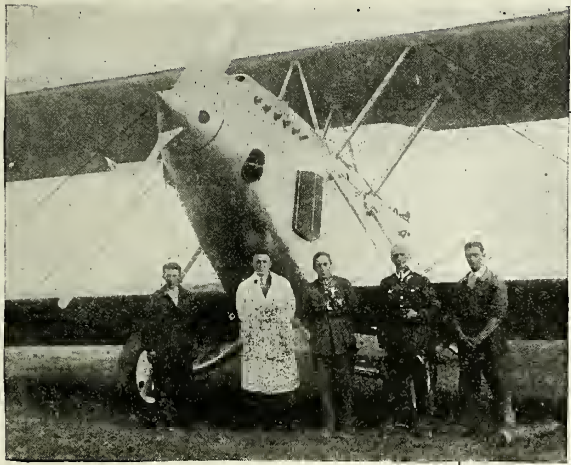
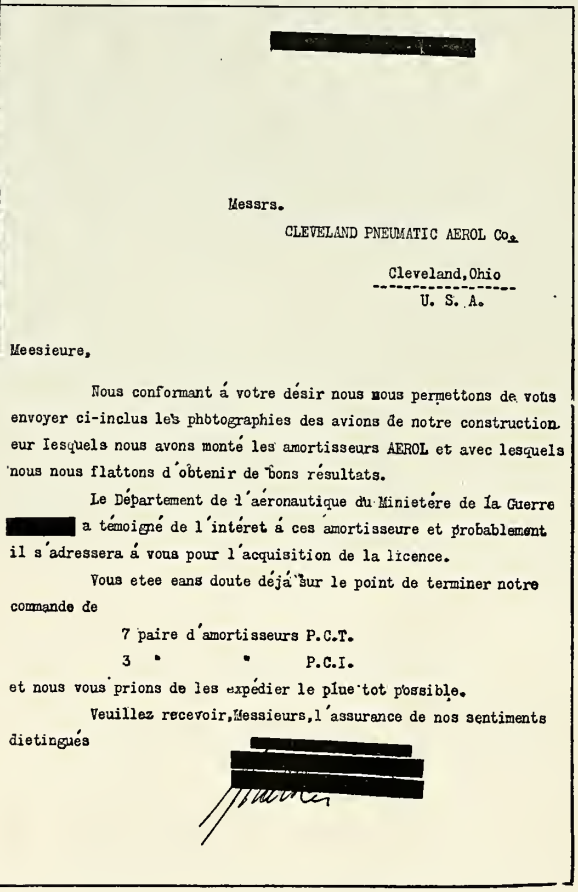
What Aerol Struts are doing in Foreign Countries





[redacted]

Messrs.
CLEVELAND PNEUMATIC AEROL Co.
Cleveland,Ohio
U. S. A.

Meesieure,

Nous conformant á votre désir nous nous permettons de vous envoyer ci-inclus les photographies des avions de notre construction eur lesquels nous avons monté les amortisseurs AEROL et avec lesquels nous nous flattons d'obtenir de bons résultats.

Le Département de l'aéronautique du Minietére de la Guerre [redacted] a témoigné de l'interet á ces amortisseure et probablement il s'adressera á voua pour l'acquisition de la licence.

Vous etee eans doute déjá sur le point de terminer notre commande de

7 paire d'amortisseurs P.C.T.
3 " " P.C.I.

et nous vous prions de les expédier le plus·tot possible.

Veuillez recevoir,Messieurs,l'assurance de nos sentiments dietingués

[redacted]

The following is a translation of the letter shown at the right.

"Complying with your desire, we take the liberty of sending you enclosed, the photograph of the aeroplane of our construction upon which we have mounted the Aerol Shock Absorbers, and with which we flatter ourselves that we have obtained good results.

The Department of Aviation of the Ministry of War has expressed interest in these shock absorbers and probably will address you on the subject of the acquisition of the license.

You are without doubt upon the point of finishing our order for:

7 pairs of Shock Absorbers PCT
3 pairs of Shock Absorbers PCI

and we request you to expedite this in every way possible.

Please accept, gentlemen, the assurance of our highest regards.

Yours very truly,
E. PLAGE.
T. LASKIEWICZ."

This letter indicates the international prestige enjoyed by Aerol Struts. Their ability to perform under any flying conditions, practically without maintenance, has made them a permanent factor in the aircraft industry. This is further borne out by the fact that 22 manufacturers have already adopted these struts as standard equipment and practically all other domestic manufacturers are recommending them as optional equipment.

Aerol Struts are manufactured by the Cleveland Pneumatic Tool Co., Cleveland, Ohio. Requests for information will be answered promptly.

AEROL shock absorbing STRUT

(*Kentucky News continued*)

rounding towns took part in the programs. The Kentucky Air Board and the Kentucky Progress Commission plan to advocate a campaign to have every town in the state air marked.

ARTICLES of incorporation have been granted to the Ohio Falls Airport Company, Louisville. The newly organized company which is capitalized at $50,000 plans to build and operate an airport here. Incorporators were Lee Miles, Curtiss C. Webb, H. J. Gates, James C. Willson and Fred Levy.

WORK is progressing rapidly on the new $60,000 hangar now under construction at Bowman Field for the Curtiss Flying Service. The new hangar will be ready by June, it has been announced. C. S. Russell, Garden City, New York, engineer for the Curtiss company, has been in Louisville to supervise construction.

The hangar will house twenty-five or thirty planes. The door will admit a plane with a one hundred foot wing span. Space for two more hangars has been leased by the company. The hangar will also house an administration office and shops.

IT has been made known that officials of the Pennsylvania and the Louisville and Nashville railroads have under consideration the establishment of a large air terminal in this vicinity for the use of commercial planes.

A HUNDRED and twenty-five acre tract of land, located north of Jeffersonville, just across the river from Louisville, has been acquired by the company. The new airport is located in a triangle formed by roads leading from Jeffersonville and New Albany, and from these cities to Indianapolis. The field is only a little over three miles from the center of the Louisville business district and can be reached in five minutes from the Ohio River. This will make it accessible to seaplanes and amphibions.

It is planned to use this port when Bowman Field, the municipal airport in Seneca Park, Louisville, becomes too crowded. The tract will be sodded and graded, and when sufficient development justifies it, an additional tract will be added and hangars will be built.

TENNESSEE

Dedication of Memphis Municipal Airport

By E. B. Ayres

FORMAL opening of the new municipal airport will be held June 14th and 15th at Memphis, Tennessee. Plans are being rushed for the completion of the new administration building. This building is being constructed by the Standard Oil Co. of Louisiana, at a cost of $80,000 in consideration for the sole rights of gasoline and oil on the field.

The Curtiss Flying Service has started erection on its hangar. Horace G. Rosson, president of the Memphis Aero Club, Inc., and manager of the Memphis branch, arrived from Chicago and announced 14 ships were to be the nucleus of the company's fleet. At present the Curtiss company is operating at Armstrong Field.

The Universal Aviation Corporation's new hangar will measure 95 feet by 150 feet. H. E. Basher, Universal representative from Cincinnati, said that managers in charge of the various departments in Memphis have not yet been chosen, but probably would be soon.

There will be prizes and races on the opening days of the dedication of the municipal airport. Invitations have been sent to governors of the states adjoining Tennessee. Invitations have been sent to the various Army fields also inviting the command of each to send a squadron of planes to Memphis. Over one hundred planes are expected for the dedication.

The Tri-State Aviation Company will continue to operate at its present field located on the Raleigh Road. Lieut. Earl Hughes is chief pilot and Pat Barrou is assistant. H. T. Dawkins is manager of the field.

CHATTANOOGA

[James S. Lindsey]

BENJAMIN KING, former operator of Marr Field, now in the airport design business, has been chosen to engineer Chattanooga's new airport.

(*Continued on next page*)

86% of the Aircraft Exhibited at Detroit Show were made by users of

HASKELITE Plywood

ONCE more the astounding preference for the water-resisting, blood albumen glued plywood, HASKELITE, was effectively demonstrated at the 1929 Detroit Show. Exactly 86% of the planes exhibited, exclusive of the all-metal aircraft, were shown by users of HASKELITE. That's another recognition of the fact that this high quality, weatherproof, plywood always gives the uniformity and strength necessary for modern aircraft. Write for the latest engineering tables. Sent to engineers and manufacturers free of charge.

HASKELITE must be good, for at every recent aircraft show at least 85% of the planes were exhibited by HASKELITE users.

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EFFICIENT HANGARS

Quickly Erected
Economically Priced
Fireproof Throughout

THE SECRET
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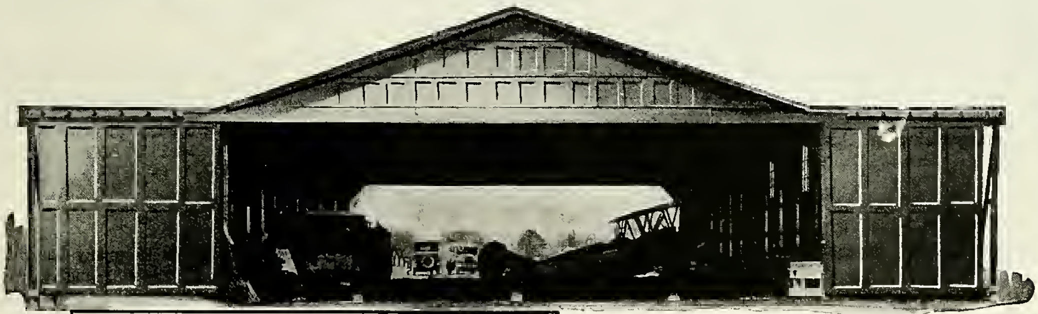
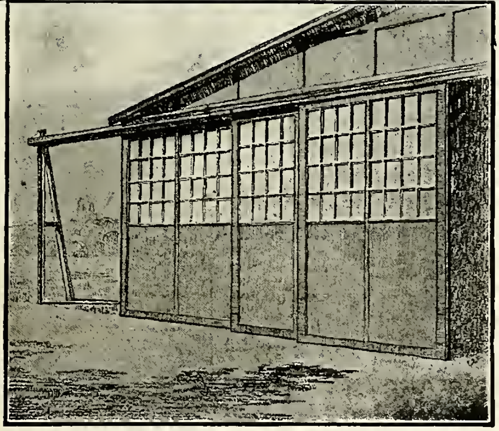
OF SUCCESS





Types and Sizes of Truscon Hangars and Steel Doors for every requirement.

These fireproof Truscon Hangars have unobstructed floor space and full opening doors to insure utmost ease in handling airplanes. They are designed to meet individual conditions, with machine shop attached if desired. Truscon Hangars are fireproof throughout, with steel windows, steel doors and insulated Steeldeck roofs — all manufactured completely in the Truscon plant. Prompt delivery, quick erection and economical cost insure all-round satisfaction and greatest value. Write for suggestions and quotations.

STEEL HANGAR DOORS

Truscon furnishes steel hangar doors adapted to any type of construction or hangar design. They are sturdily built of quality workmanship, operate easily and offer minimum interference to the movement of airplanes. Both straight and curved track types are available. Write for full information and literature.

TRUSCON STEEL COMPANY - YOUNGSTOWN, OHIO
AERONAUTICAL DIVISION
TRUSSED CONCRETE STEEL COMPANY OF CANADA, LIMITED, WALKERVILLE, ONTARIO
Offices in Principal Cities of the United States and the Dominion of Canada

(*Tennessee News continued*)

The new airport, which is to be named Lovell Field in honor of John Lovell, who has done everything within his power to boost aviation in Chattanooga, is to be equipped with a terminal building to cost $18,000, a hangar 100 by 120 feet to cost $20,000, and a hard-surfaced runway 100 by 2,500 feet to cost $40,000. Additional items such as lights, passenger conveniences, parking space and markers are also planned.

The Interstate Airlines were to purchase the city's option on the Hoskins tract if the city did not buy it. Mr. Schauffler said that if an adequate field was not available by July 1 that there was a possibility of Chattanooga's losing its mail service.

THE Chattanooga Engineer's Club was recently addressed by David Tuck of the Holophane Glass Company of New York. Mr. Tuck explained how airports should be lighted and described a floodlight which consumes 150 amperes and which would illuminate an entire field.

JOHN LOVELL is organizing an Aero Club affiliated with the National Aeronautic Association.

J. W. MATTHEWS has succeeded Farr Nutter as Interstate Airline's manager of Marr Field.

MANY students are now taking lessons at Marr Field under the instruction of Ed Stork of Interstate Airlines.

NASHVILLE

[VIRGINIA MATTHEWS]

THE Interstate Flying School of the Interstate Airlines, Inc., operators of the airline from Chicago to Atlanta by way of Nashville, will probably open at the new Tennessee Sky Harbor near Murfreesboro on June 1.

The school will offer courses in primary and advanced flying, including instruction in aerodynamics, theory of flying, and airplane engines. There will be a faculty of five instructors, and three types of planes will be used for instruction.

WHETHER or not the caption of Nashville's ordinance, designed to empower the city to acquire grounds for an aviation field, is broad enough to cover the bill is a matter that may be determined by the courts. Although dealing with provisions for the establishment of such a field, the caption of the bill contains no reference to aviation or an airport.

APPROXIMATELY thirty-five boys entered a model airplane contest held here recently to stimulate youthful interest in aeronautics. Prizes and cups were awarded the winning models.

NASHVILLE may be included in the 1929 itinerary of the National Air Tour, according to William B. Mayo, chief engineer of the Stout Metal Airplane Division of the Ford Motor Company.

LOUISIANA

[HAROLD A. DEMPSEY]

DESPITE a move on the part of camp owners on the shore of Lake Pontchartrain to prevent the erection of New Orleans' municipal airport, the Orleans Levee Board, which has the project in hand, has let the first contract for the filling and bulkhead which will extend out into the lake two thousand eight hundred feet.

Objectors to the project have taken their plea to the Louisiana State Supreme Court, seeking to halt the work on a technicality. The new port will be located on Lake Pontchartrain, adjacent to the east bank of the Industrial Canal. It will have a land depth of three thousand feet. It is expected that the work will be completed within five months.

THE landing field at Crowley, La., is being improved. According to an agreement with the owners of the field, Jules Baronet and Son, two adjacent fields will be used on alternate years in order that the use of the land for rice raising shall not be interfered with.

THE Wedell-Williams Company has purchased the assets of the Menefee Airways at New Orleans. The new company will temporarily use the Menefee Field on St. Bernard highway and will operate five

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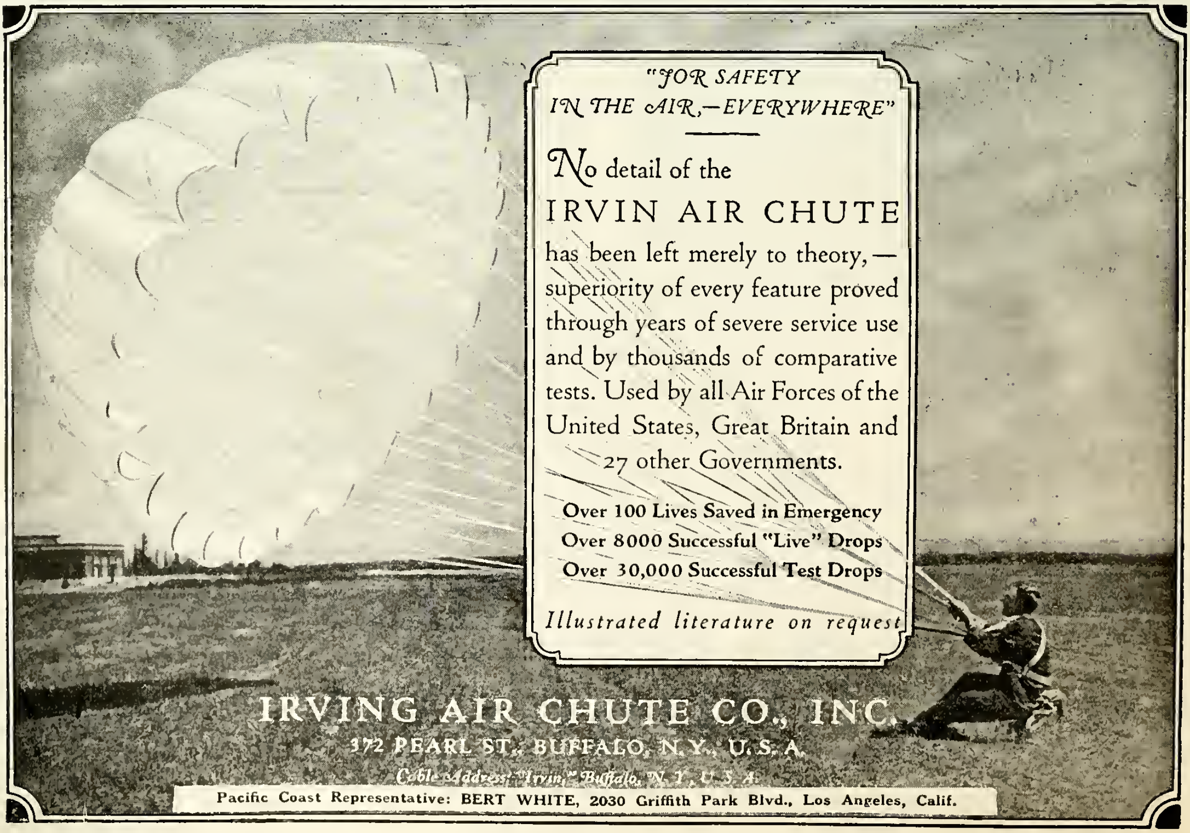

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No detail of the IRVIN AIR CHUTE has been left merely to theory,—superiority of every feature proved through years of severe service use and by thousands of comparative tests. Used by all Air Forces of the United States, Great Britain and 27 other Governments.

Over 100 Lives Saved in Emergency
Over 8000 Successful "Live" Drops
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LOWEST PRICES——LESS TIME TO LEARN——LESS LIVING EXPENSE

DALLAS AVIATION SCHOOL DALLAS TEXAS

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Ten years safe and sane flying and instruction.

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New up-to-date licensed training planes.

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Incorporated for $200,000 Capital Stock.

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Largest flying school in the South. Capt. W. F. Long, president.

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50,000 square feet hangar and shop space.

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We Pay Your Railroad Fare

From any point in the United States if you enroll for commercial or transport pilot's course. Write us at once.

Our Prices

Primary Course, 10 air hours	**$150**
Advanced Course, 15 air hours	**$250**
Private Pilot's Course, 20 air hours	**$325**
Commercial Course, 50 air hours	**$750**
Transport Course, 200 air hours	**$2,000**
3 Months' Ground Course	**$100**

Every day is a flying day in Texas. Save one-third to one-half on your course with us. Why Pay More?

Rooms and Board. Right on the field at $8.00 to $10.00 per week. ***Personal Instruction.*** Each and every student is given personal and individual instruction at all times. ***Nationally known.*** Our school is known from coast to coast and we have student pilots here from practically every state in the Union. ***New Airplane Factory.*** Will be in operation by June 1st and our students will be given instruction in aircraft manufacture.

We require no bond of our students. Dallas is a metropolitan city of 300,000 population. You can start training on day of arrival. Regular classes in meteorology and air navigation. Our flying field is one of the best in the country. Our instructors are Licensed Transport Pilots.

Everything Is In Favor Of The Student Pilot Here

We are making everything attractive here for each and every student in the country, and our special offer of railroad fare is an extra inducement and a saving worth while. Write for our catalog.

Affiliated with DALLAS AVIATION INDUSTRIES, airplane manufacturers, aviation supplies, motors, motor parts. Distributors Swallow and American Eagle Airplanes.

DALLAS AVIATION SCHOOL

Love Field, Dallas, Texas

LARGEST AVIATION CONCERN IN THE SOUTH;——REFERENCES: DALLAS CHAMBER OF COMMERCE, MERCANTILE NAT'L BANK

(*Louisiana News continued*)

planes. The new company will continue to sell the Lincoln-Page biplane and the Ryan Brougham.

Officers are: James Wedell, president; Harry Williams, vice president; Edmund Denis, secretary-treasurer; William Wedell, flight instructor; and Charles Fortune, ground school instructor.

DEASON FIELD, the municipal landing field of Waterproof, Louisiana, was dedicated on May 10 before a crowd of about 5,000 people.

IN connection with the leasing of part of Menefee Field by Southern Air Transport, improvements amounting to over $35,000 are now under way at the Menefee establishment.

A new steel hangar with a concrete floor, measuring 100 by 100 feet, and equipped with concrete aprons, is under construction and will be completed in sixty days. This will provide accommodations for housing thirty planes at the field. Seven floodlights, a ceiling projector, wind indicator light, rotating beacon, obstacle and approach lights and thirty-six boundary markers have been ordered for use in night flying.

Three runways, each four hundred feet wide, have been laid out at the field and covered with cinders and shells. They vary in length from 2,965 feet to 3,485 feet. Obstacles near the borders of the field are being cleared and a drainage system installed.

The air mail which has been handled from Alvin Callender Field across the Mississippi River has been transferred to Menefee Field and seven-day service has been started on the Atlanta to Houston air mail route.

THE project of giving Alexandria, Louisiana, a municipal airport has gained considerable headway. Plans call for two runways, forming an elbow on the field, which will be approximately 3,000 feet in length and 300 feet wide. Hangars and other equipment will be erected on the field in the near future.

ANNOUNCEMENT of the acquisition of the Southern Air Transport, Inc., by the Aviation Corporation was made by officials of the companies in New Orleans and Fort Worth, Texas, on May 9. The merger comes scarcely a month after the Southern Air Transport, Inc., was formed from the consolidation of six southern companies as announced in the April issue of the AERO DIGEST.

SOUTH CAROLINA NEWS

THE chamber of commerce and the Exchange Club of Georgetown, South Carolina, have secured a field of 118 acres one mile from the center of town and are building two runways, each 200 feet wide and 2,500 feet long. A hangar will also be erected.

TEXAS

[RUBYE THOMPSON]

AIR passenger service from Dallas to Cleveland and Columbus, Ohio, was to be started on May 25th through a hookup of the Southwest Air Fast Express and the Universal Airlines, it was announced recently by the S. A. F. E. traffic representatives at Dallas.

Passengers will leave Dallas at 8:30 a. m. daily in a S. A. F. E. plane and arrive in St. Louis at 3:15 p. m., there transferring to a ship of the Universal line. Persons using the route may board trains at Indianapolis, Cleveland, or Columbus for New York City, thus traveling three-fourths of the way by plane and saving a day's time.

FASTER service over the National Air Transport air mail line became effective May 1st. An additional business day is now saved in the transmission of air mail between Dallas and other points in the Southwest and the Pacific Coast.

Planes leaving Dallas at 7:30 p. m. arrive at Los Angeles at 4:15 a. m. and at San Francisco at 4:30 a. m. the morning of the second day. Mail destined for Pacific Coast points and placed in the Dallas postoffice or at other points along the N. A. T. line from Kansas City south, at the close of business, is flown to Kansas City that night, transferred to another plane and carried to Omaha, where it connects with the westbound transcontinental for delivery to San Francisco and Los Angeles.

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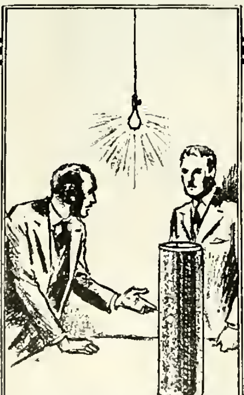
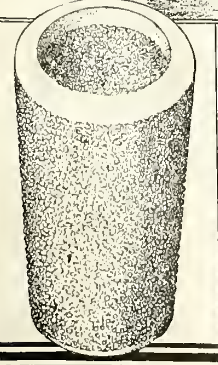




"Just Full of Holes!"
— Yet It Exceeds
A. S. T. M. Requirements!

ONE has but to place a lighted electric lamp inside a length of Poroswall Rapid Drain Pipe in a darkened room to appreciate the reason for the enormous porosity of this pipe. "It's just full of holes!" is the exclamation which escapes every one's lips whenever this test is made.

According to the Columbia Testing Laboratories, a square foot of wall area of this pipe will allow nearly five gallons of water to pass through it in one minute.

And yet it has the strength and permanence of concrete! It *is* concrete. It easily exceeds the strength requirements of the American Society for Testing Materials.

The Most Efficient Drain for Airports, Golf Courses, Playgrounds, Highways, Sewer Under-Drains, Sewage Disposal Plants, Excavations, Etc.

Walker Cement Products, Inc., Little Ferry, N. J.

WALKER
POROSWALL
RAPID DRAIN PIPE

POWER

"... like a skyrocket"

CONTACT! The new Stearman Royal Coach hops off!...it's beautiful, graceful, luxurious and complete...Power aplenty, like all Stearmans. Power that gives these ships that easy nonchalance in take off, that lack of strain in altitude or storm, and longer runs between overhauls. For you can throttle down, use only a part of the available power, and still be going somewhere...These things are Stearman, the favorite name among pilots.

WEIGHT DATA	
Weight, light	2565 lbs.
Pay Load (with 100 lbs. baggage)	780 lbs.
Fuel (110 gallons)	660 lbs.
Oil (10 gallons)	95 lbs.
Gross weight	4270 lbs.

PERFORMANCE DATA	
Maximum speed	135 miles per hour
Cruising speed	115 miles per hour
Landing speed	47 miles per hour
Service ceiling	16,000 feet
Rate of climb (sea level)	900 feet per minute

THE STEARMAN AIRCRAFT COMPANY, WICHITA, KANSAS

STEARMAN

SAN ANTONIO

[Gene Smith]

A NEW system of communication between instructors and their students while flying has been worked out by a board of officers from Brooks, Kelly, and Duncan Fields for use in the Primary and Advanced Flying Schools here. An initial order for 150 of the new devices has been placed.

This new apparatus consists of a microphone placed on the dashboard in front of the instructor and connected by telephone wires with earphones worn by the student inside his helmet. The connecting wires can be automatically disconnected by a slight pull from any angle, so that the student will not be encumbered in making a parachute jump in an emergency or in leaving the plane after landing. The new apparatus is creating considerable interest in commercial aviation circles.

JACK BERETTA, for the past year president of the San Antonio chapter of the National Aeronautic Association, has been appointed Governor of the N. A. A. for Texas.

Beretta's first official interest is to start the wheels rolling to bring the 1930 National Air Races to San Antonio. To this end, he will head a delegation from San Antonio to Cleveland for the current races. He also plans to inaugurate an "All Texas Air Tour" as a means of stimulating interest in commercial aviation.

MEMBERS of the San Antonio chapter of the National Aeronautic Association, headed by E. A. Feille, newly elected president, are launching a statewide movement for the founding of a chair of aviation in the University of Texas, Austin.

They are urging the establishment of a full four-year course in aerodynamics, navigation, meteorology, mechanics, and pilot's course. Establishment of this chair of aviation has been adopted as the major activity of the local chapter for the ensuing year.

MELVIN J. MAAS, the 31-year old "flying congressman" from St. Paul, Minn., who is the only member of that body now holding a Department of Commerce pilot's license, spent the interval between the two sessions of Congress at Brooks and Kelly Fields flying the newer type ships.

PILOTED by Capt. H. A. Dinger, the *Question Mark*, Army endurance plane, made a trip to San Antonio with Congressman W. Frank James, chairman of the House military affairs committee, who came to the city to confer with Maj. Gen. James E. Fechet, chief of the Air Corps, and Brig. Gen. Frank P. Lahm, commanding officer of the Air Corps Training Center, and to inspect the development at Randolph Field and Army housing needs generally.

AIR passenger service between San Antonio and north Texas has been inaugurated by Texas Air Transport, Inc. The service between San Antonio and cities in north Texas and Corpus Christi and Brownsville, is the first step in a network radiating out of the city.

D. F. C. to Lieut. Nutt

LIEUT. L. C. NUTT of Brooks Field has been awarded the Distinguished Flying Cross in recognition of his distinguished service as a member of the Alaskan flight nine years ago. The presentation was made by Major S. W. Fitzgerald.

A NEW type form-fitting parachute pack invented by Master Sergeant Erwin H. Nichols of Brooks Field, instructor in the parachute department of the Primary Flying School, is to be manufactured by the Irving Air Chute Company. A regulation parachute is used, but instead of its being folded in the customary seat pack, it is placed in a pack that fits snugly over the back from the shoulders to the hips. This pack does away with the need of a back other than a top rail on an airplane seat. It was worked out for use in cabin ships, transports, bombers, and other craft in which the passengers move about while in flight.

The Air Corps has placed an order for 40 parachutes with the new packs.

FORT WORTH

[Capt. W. H. Scott]

E. M. GHOLDSTON, chief mechanic for the city at the municipal airport for the past two years, has resigned and has become affiliated with Texhoma Aeronautical Service, Inc., as service manager.

The concern was recently formed by C. T. Pendleton, local oil operator, for the sale of Stinson planes in Texas and Oklahoma. Randolph Page is vice president and general manager of the concern.

Four different types of Stinson planes now are located at the municipal airport. They include two Stinson juniors, one of which is powered with a Wright 150 horsepower engine and the other with a 110 horsepower Warner. A six-place Stinson monoplane powered with a Wright 300 horsepower engine and an eight-place Stinson powered with a Wasp 425 horsepower engine complete the equipment.

TEXAS AIR TRANSPORT has completed negotiations for the purchase of its own airport and the erection of several hangars. The company will take over the new field about June 1.

This company's removal from the local municipal airport resulted from the lack of hangars. During the past month the firm has had as many as eight ships staked out through lack of hangar space.

MAJOR F. H. BLAKE, commander of the National Air Cadets, opened a workshop at the Panther Boys' Club for the instruction of cadets in the mechanical side of aviation and high school students in the ground work of aviation. The school costs cadets fifty cents a year for membership and there are now over 80 boys under instruction in the various phases of the work.

SETH BARWISE, Henry Woods and other members of the Texas Flying Service visited Ranger, Texas, for the purpose of opening a branch flying school.

BILL FULLER, manager of the local airport, has petitioned the city manager for another hangar at Meacham Field. It is hoped that workmen now building the third hangar will be retained for the building of another new one of similar size.

City Manager Carr announced that a bond issue for approximately $500,000 would be voted upon at a special election, the whole of the money to be used for building hangars and making other improvements at the airport.

DALLAS

[Capt. W. H. Scott]

PLANS are maturing for the erection of perhaps the largest hangars in the country at Love Field and Hensley Field, Dallas. These hangars will be built to house big multi-motored planes of the future as well as the largest ships built today. Additional modern repair shops will be built, as well as radio stations, passenger waiting rooms, ticket offices, an administration building and other necessary facilities.

At Hensley Field the Government will erect a new hangar measuring 220 by 110 feet. This will afford ample room for the larger of the Army Air Corps ships. This new field, it is claimed, will rank beside the greatest of the Army air schools and training fields.

Assistant Secretary of War, F. Trubee Davison, during a recent visit to the field, stated that the new acquisition was about the best field in the country provided by a local city administration.

TWENTY-TWO ships recently left Dallas and Fort Worth to take part in the opening of the airport at Sherman. Ships from all over Texas and Oklahoma also took part in the festivities.

AN airport for every city in Texas was outlined by the committee of the Dallas Junior Chamber of Commerce at its preliminary meeting prior to the convention at Corpus Christi next month. These fields would be complete with markers and gas stations. Emergency landing fields will be sought at every possible location.

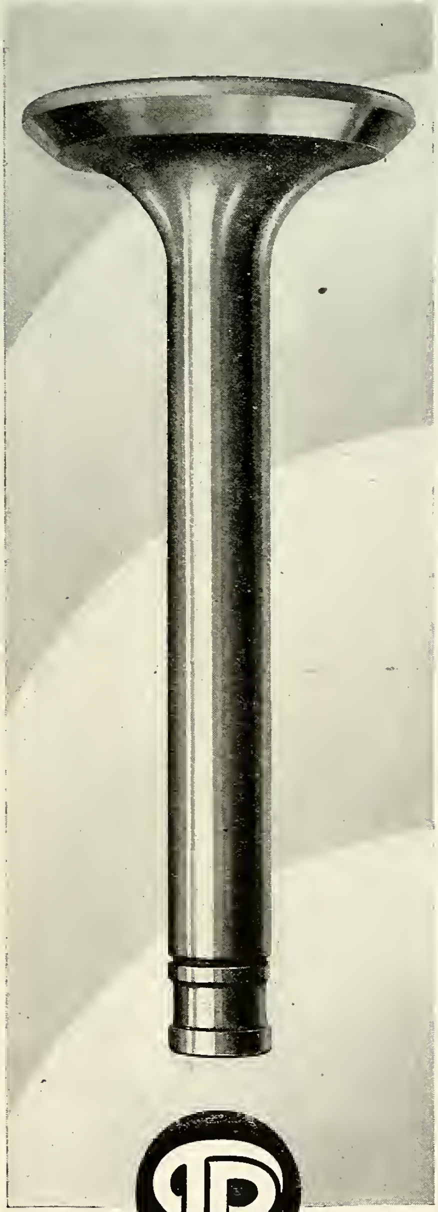
MANUFACTURE of the first "harnessed air stream" type of airplane, invented locally, is soon to get under way in Dallas, according to J. C. Martin, president of the Dallas Aeroplane Manufacturing Corporation.

The ship will look much like those in use. In this new type aircraft, the propeller wash will flow through a tube six or seven feet in diameter to be taken up at the rear end by another propeller giving additional thrust.

Officers of the corporation are J. C. Martin, president; C. O. Laney, vice president; C. M. Cockrell, treasurer; D. R. George, secretary; and C. K. Bullard.

ONE hundred seventy reserve air officers have been ordered to Hensley Field for training during the ten-week summer encampment. For the training course forty regular Army instructors are to be assigned.

FLEET EFFICIENCY



Because of their greater resistance to combustion heat, pound and wear, Thompson Valves are the first choice of transport engineers seeking maximum fleet efficiency and greater pay load.

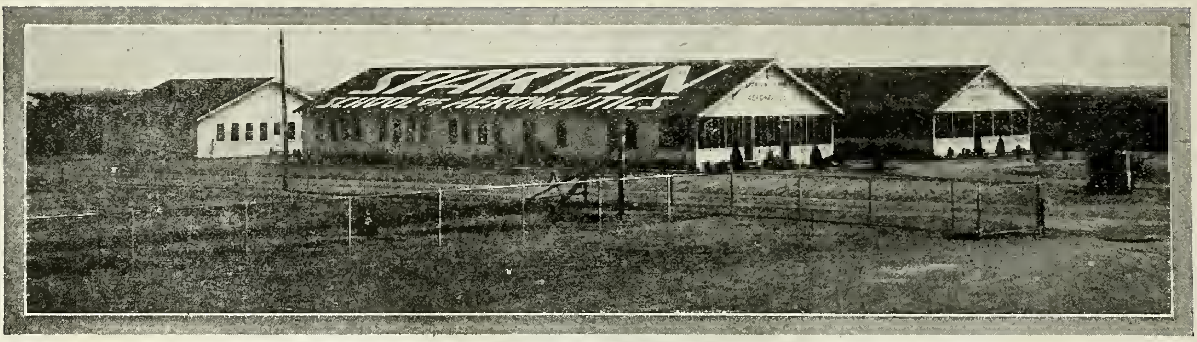
Their superior sealing qualities raise the average of flight hours and improve the fuel record of any airplane motor.

THOMPSON PRODUCTS,
INCORPORATED
Offices: Cleveland, O., U.S.A.
Factories: CLEVELAND and DETROIT

TRADE MARK

Thompson Valves

Original Equipment in 95% of American Built Aero Motors



Buildings of the Spartan School of Aeronautics at Tulsa, Oklahoma.

OKLAHOMA

FOUR buildings are included in the equipment of the Spartan School of Aeronautics which was formally opened May 1. The main building includes instructors' offices, three classrooms, library and stockroom. A second building contains living rooms, lounge, showers and private rooms to accommodate 40 full time students. A technical laboratory which will accommodate a fully rigged plane, and a school garage complete the new facilities. There is a restaurant on the field.

WILLIS C. BROWN, who recently resigned as president of the Spartan Aircraft Company, Tulsa, Oklahoma, is now American representative of J. Walter & Company, Prague, Czechoslovakia, manufacturers of Walter airplane engines.

Mr. Brown has opened offices in Tulsa, Oklahoma.

THE Garland Aircraft interests of Tulsa, Okla., recently purchased 160 acres of land which will be constructed into the Garland Airport to be used as a training and sales field. Construction will start at once on the new field, and the Garland-Clevenger interests will be moved shortly from the municipal airport.

The site selected for the airport is five miles southeast of the business section of Tulsa. It will be the seat of operations for the Garland Aircraft Corporation, Garland-Clevenger School of Aeronautics and the Mid-Continent Airways, and will be used by these various interests as a pilot training college and a point of distribution for Curtiss airplane products, Consolidated Husky Junior training planes, and Cessna and Stearman planes, for which these Garland interests are distributers throughout Oklahoma, Texas, New Mexico and the Republic of Mexico.

The airport is a half mile square, and will be an all-direction flying field, on which will be constructed an administration building, student barracks and classrooms, hangars and an aviation clubhouse. The first hangar to be built is now under construction and will be approximately seventy feet by a hundred and twenty feet.

The curriculum of the school is modeled after the Army training course and is designed to qualify a student for any desired Department of Commerce license.

In addition to operating a pilot training college, and the selling and distributing of airplanes, the port will also cater to private air travel and the maintenance of privately owned airplanes. The plans call for a completely equipped machine shop and a roadside gasoline station for servicing both airplanes and automobiles.

KANSAS

[TOM PAGE]

TOPEKA is now on the airline between Kansas City, Wichita, and Tulsa. One trip is made each way every day of the week. The plane leaves Kansas City at 8:00 a. m., arrives in Topeka at 8:30, and in Wichita at 10.30. The return plane leaves Wichita at 5:00 p. m., arrives in Topeka at 7:00, and reaches Kansas City at 7:30.

The line was operated by the Central Air Lines of Wichita, but was taken over by the Braniff Air Lines of Oklahoma City on May 6.

NINETY-SIX students are enrolled in the school of the Roy Morris Aircraft Corporation of Topeka. Roy Morris is president; Charles Chapman, vice president; C. W. McCarty, secretary-treasurer, and Frank Dove, chief engineer and instructor.

THE Topeka Aeronautical Service and the Athon Flying School are operating from Athon's airport, six miles east of Topeka. The airport will be used by the Topeka Aeronautical Service to assemble and test fly the Baby Ace, a one-place sport monoplane.

A TWO-PLACE training monoplane is being developed by the Topeka Aeronautical Service of Topeka. The plane will use a LeBlond 60 or a Velie M-5 engine.

The Baby Ace, built by the Topeka Aeronautical Service, was test flown with a Henderson motor. The motor mount has now been altered so that several different types of motors can be installed. A Szekely or Anzani engine will be used in the plane.

WICHITA

THE Beezle Bug, the first plane manufactured at the Braley School of Flying at Wichita, Kans., was flown to Mexico recently to enter the service of the Inter-Americas de Transportes Aeros. Paul Davis, pilot of the Mexican firm, flew the plane. Facilities are being prepared at the Braley airport for the regular production of these craft.

A. W. MOONEY, formerly chief engineer for the Alexander Eaglerock company of Colorado Springs, Colo., has organized the Mooney Aircraft Company at Wichita, Kansas, and is making plans for the production of a new low-wing monoplane in the near future. H. L. Shaffer of Denver, Colo., will be associated with Mr. Mooney in charge of the finances of the concern, L. H. Height and Don R. Robinson will assist in the engineering plans.

FACTORY space in the plant of the Travel Air Manufacturing Company at Wichita, Kansas, has been increased to 150,000 square feet with the addition of a fifth unit which was recently constructed. This is the second addition to the Travel Air factory this year, two units which doubled the 1928 space having been constructed previously. The latest addition will be used as an assembly plant for the 4 and 6-place cabin monoplanes.

ANDRE TEMPE has joined the Braley School of Flying at Wichita as superintendent of the ground school department. In this position Mr. Tempe is reorganizing the ground school in conformity with the added space given the school by the recent completion of new buildings.

Mr. Tempe has been connected with aeronautics since 1914. He was connected with airplane manufacturers in Germany and France before coming to America in 1916.

MISSOURI

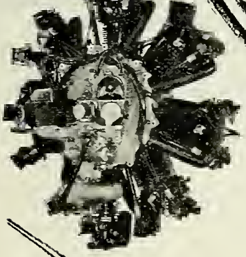
NEGOTIATIONS with the Polish government at Warsaw by the export department of the Nicholas-Beazley Airplane Co., Inc., of Marshall, have resulted in the sale of a Warner Scarab motor to be used for testing purposes. The Polish government recently decided to test American made airplane motors as possible standard equipment on all government planes, according to W. F. Potter, export manager of the Marshall concern.

THE Nicholas-Beazley firm has announced the establishment of its eighth parts and supply depot with the appointment of Boozer Bros. of Conrad, Montana, as an authorized Nicholas-Beazley representative. The Conrad concern is also distributor in the Northern parts of Montana and Idaho and part of Southern Canada for the Barling NB-3 monoplane.

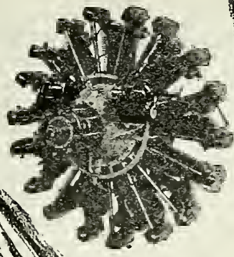
(*Continued on next page*)

SCINTILLA

AIRCRAFT MAGNETOS

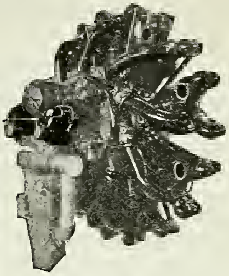


Warner Scarab



Wright Whirlwind
J-5

Curtiss Challenger



Pratt and Whitney
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AERONAUTICAL CHAMBER OF COMMERCE

The majority of modern American Aeronautical Engines are equipped with Scintilla Magnetos.

They are selected because of their

DEPENDABILITY SIMPLICITY
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Scintilla Aircraft Magnetos are standard equipment on Aircraft engines built by

Aeromarine Corporation
American Cirrus Engines, Inc.
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Curtiss Aeroplane & Mfg. Co.
Kimball Aircraft Corp.
Kinner Aeroplane & Motor Co.
LeBlond Aircraft Engine Corp.

Lycoming Mfg. Company
Michigan Screw Company
National Aero. Corp.
Packard Motor Car Company
Pratt & Whitney Aircraft Co.
Rocky Mt. Steel Prod., Inc.
The Alliance Aircraft Corp.
Velie Motors Corp.
Warner Aircraft Corp.

Wright Aeronautical Corp.
and other well known aeronautical engine builders

Scintilla Aircraft Magnetos can be obtained for engines of from one to eighteen cylinders.

SCINTILLA MAGNETO CO. INC.

SIDNEY - NEW YORK

Contractors to the U.S. Army and Navy

(Missouri News continued)

JIGS to standardize the installation of the wing on the fuselage of the Barling NB-3 monoplane have recently been designed and perfected by P. O. Gibson, engineer of the Nicholas-Beazley Airplane Co., Inc. The points of attachment are constructed on the jigs so that every wing produced in the factory will fit any fuselage without a preliminary fitting. The time required for installing the wing has been reduced to ten minutes by the new process.

THE export department of the Nicholas-Beasley Airplane Co., Inc., has recently added the foreign distribution and sales of the Swallow Airplane Co., of Wichita, Kansas, to the line of aeronautical products for which it holds exclusive foreign franchise rights. Distribution will be handled by the export department through a network of foreign depots.

LEBLOND engines will be shipped to the Nicholas-Beazley Airplane Company in carload lots shortly to fill the demand for the motors which are standard on the Barling NB-3, according to a recent announcement of officials of the LeBlond Aircraft Engine Corporation of Cincinnati. Machinery, tools and skilled workmen are being added to the LeBlond factory as rapidly as possible. It is expected that production will soon be at the rate of five a day.

KANSAS CITY

[H. H. James]

THE Central Air Lines, operating an air passenger line between Wichita, Kansas City and Tulsa, has been sold to the Braniff Air Lines, Inc., a division of Universal Airways. The sale included the six Travel monoplanes of the Central lines and hangar facilities at Kansas City, Tulsa and Wichita. Walter Beech, president of the Travel Air company, Wichita, and E. A. Watkins, president of the Central Air Lines, become directors in the Braniff organization.

THE American Eagle Aircraft Corporation has recently sold several planes by mail, with an average of 100 letters a day coming in to the company in response to its national advertising campaign. E. E. Porterfield, Jr., president of the American Eagle company, insists that every one of the letters be given a personal answer.

American Eagle Aircraft Corporation is soon going into production on its new four-place cabin monoplane. This plane is being engineered for a range of four new production motors.

COL. ARTHUR C. GOEBEL, president of the Goebel Flying School, has announced that several Army officers, on leave of absence, will be instructors at his school.

The Army officers who will come here in turns to instruct at the Goebel school, will do so with the consent of Maj. Gen. James E. Fechet, Chief of the Army Air Corps. Their leaves will be for the purpose of instructing in the Goebel school.

The Goebel school's new building at the municipal airport is expected to be completed by June 1. Classes in flying will start about June 15.

THE new Yellow Cab Airways, Inc., service between Kansas City, Omaha, Des Moines and Minneapolis, was opened Monday, May 6. Col. Art C. Goebel, noted flier who is now connected with an aviation company here, was the guest pilot for the opening trip.

THE U. S. Aircraft Engineering School here enrolled forty new students in classes started recently.

THE American Eagle Aircraft Corporation has divided the United States into zones with a district sales manager in charge of each. C. E. Whitten has been appointed district sales manager for the eastern section of the United States; H. S. (Jack) Lowe will continue in that capacity in the Middle West with Chicago as his headquarters; O. B. Polk will look after the southern territory and H. E. Trotter the western section with headquarters in Los Angeles. D. H. Hollowell is general sales manager of the company.

BEN F. GREGORY, for the last eight years an independent commercial pilot in Kansas City, has been appointed general manager of the flying activities of the Commercial Airways Corporation here.

PLANS have been completed to establish a glider manufacturing plant here. Ben Zink, glider designer and engineer, is to be general manager of the factory, with John Holliday, backing the company.

New cabin monoplane built by the Crescent Aircraft Corporation taking off.

A DIRECT air-rail passenger station is to be built at the municipal airport here by the Rock Island and Burlington railroads. Announcement of the plan was made by C. A. Searle, general passenger agent of the Rock Island Lines, after a conference with T. P. Hinchcliff, general passenger agent of the Burlington Route.

ANNOUNCEMENT has been made that the Universal Aviation Corporation would start the erection of a $125,000 building at Fairfax Airport at once, following the purchase by that company of the controlling interest in the Porterfield Flying School here.

The Universal corporation, which is starting a Kansas City-St. Louis-Cleveland air and mail passenger service and now is operating a mail and passenger line between St. Louis and Omaha, via Kansas City, also operates a chain of flying schools. The Porterfield school has been a subsidiary of the American Eagle Aircraft Corporation. Under the new deal the school will retain its name but will be a subsidiary of the Universal organization. E. E. Porterfield, Jr., president of the American Eagle company, remains as president of the school and Capt. L. A. Miller as manager.

The Universal building at Fairfax will provide office rooms and passenger station facilities. The interior dimensions of the building are to be 176 feet by 156 feet.

A NEW organization, known as the United States Airways Inc., has been formed by a group of business men. The company plans to start air passenger service between Kansas City and Denver within a month. Four planes will be purchased for this work. James L. Stephenson is president of the company, William Flynn, secretary, and H. R. Ennis, treasurer.

THE Inland Aviation Company, here, makers of the Inland Sport high wing monoplane, is getting ready to enter the commercial field. Lieut. Wilfred G. Moore has become director of sales of the Inland company. The Inland Aviation Company is headed by Arthur Hardgrave as president. The plane was designed by Dewey Bonebrake, who is vice president and chief engineer of the company.

THE Robertson division of the transcontinental air mail service connecting St. Louis, Kansas City, and Omaha, was started on May 1st at Fairfax Airport. Kansas City, with an inaugural ceremony. The first delivery of the Universal Aviation planes over the new route was attended by Wm. B. Trembley and Wm. E. Morton, postmasters for Kansas City, Kansas, and Kansas City, Missouri, respectively, who handled the first exchange of mails.

CURTISS FLYING SERVICE broke ground on April 29 for its $250,000 branch at Fairfax Airport. The beginning of the construction program was accompanied by a ceremony in which Albert T. Beach, mayor of Kansas City, Missouri, and Dan C. McCombs, mayor of Kansas City, Kansas, took part.

There's No Excuse for Failure!

The mails must go—passengers must have safe, dependable transportation. That is why the Universal Aviation Corporation, operating fleets of passenger and mail planes between Chicago, Kansas City, St. Louis, Omaha, Indianapolis, Cleveland and Louisville, chose Stanolind Aviation Products to protect their great Wasp and Hornet engines against friction.

The determining factors resulting in this choice were: Quality of Oil and specialized Lubricating Service.

Stanolind Aviation Gasoline and Stanolind Aero Oils are the choice of an ever increasing number of pilots and air transport companies throughout the Middle West. The purity and uniformity of these aviation products have been proved over long periods of air mail flying and in the exacting requirements of air races. Never has an engine failure been traceable to their faulty operation.

STANOLIND AVIATION GASOLINE
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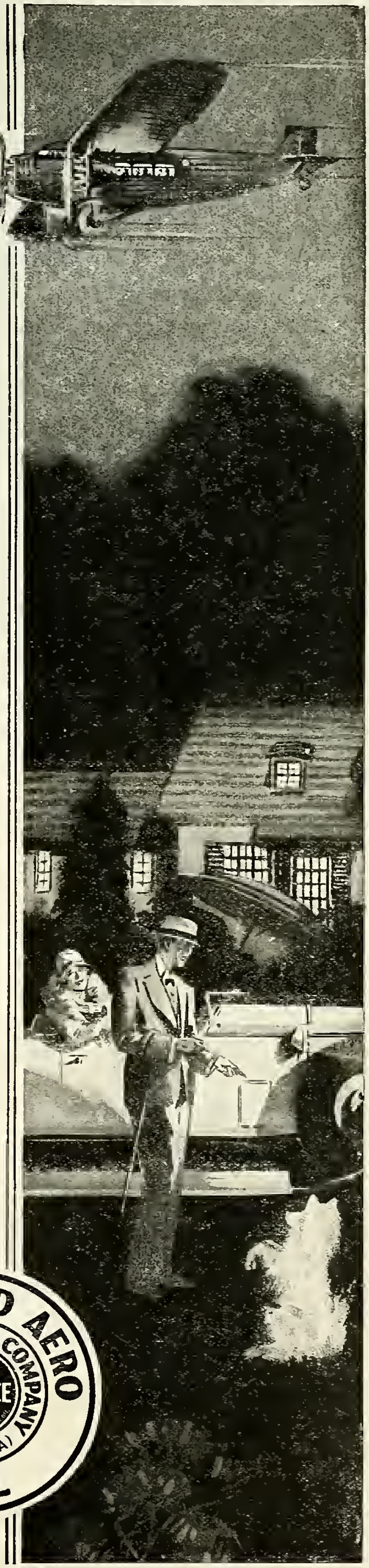
STANOLIND AERO OIL
STANDARD OIL COMPANY (INDIANA) SERVICE



318

ST. LOUIS

[A. W. LEAGUE]

AN assembly plant for the new Eaglerock Bullet is to be erected at Lambert-St. Louis Field. The Bullet was developed at the Eaglerock factory at Colorado Springs. The plant will be erected on a four-acre tract adjoining Lambert Field on the south and owned by the Von Hoffman Aircraft Corporation, local Eaglerock distributor.

THE residents of St. Louis County have voted a bond issue to improve the roads leading to Lambert Field. The most direct route to the airport is to be concreted. The distance to be improved is about eight miles and the cost is estimated at $400,000.

WITH a total 709 students on its enrollment list, the Parks Air College has surpassed its own enrollment record. Natives of thirteen foreign countries make up the enrollment at the air college. The countries represented are China, Peru, Spain, Malta, Porto Rico, Canada, Russia, Ireland, Mexico, England, Colombia and Denmark.

Thirty-five P-1s, an open biplane powered with an OX-5 motor, have been ordered for primary training at Parks Air College; eleven P-2s open biplanes powered with an Axelson 150 horsepower motor and four P-4s, a six-place cabin plane powered with the Whirlwind J-6 motor, have been ordered from Parks Aircraft, Inc. In addition, the order includes 20 OX-5 Travel Air biplanes, a Whirlwind Travel Air and two Curtiss Robins.

JOHN A. LOVE, president of Love, Bryan & Company and director in the Fokker Aircraft Corporation and Universal Aviation Corporation, has been named chairman of the board, and W. C. Ferguson, head of the executive committee of Allied Aviation, Inc., a recently formed $5,000,000 holding company, with headquarters in St. Louis. D. A. Luscombe of Moline, Illinois, is vice president of the company. Allied Aviation Industries controls three subsidiaries—Lambert Aircraft Engine Company, Mono Aircraft Company and Aviation Accessories Corporation, recently organized to manufacture and distribute accessories and equipment for aircraft.

THE Davis Bill, establishing a legal code of the air for the regulation of aircraft in the State of Missouri, has been passed by the house and the senate and the bill now goes to the governor for his signature. The bill, which was introduced in the Senate by M. H. Davis of Kansas City, adopts the Department of Commerce regulations with a few changes.

UNIVERSAL has announced the inauguration of the Sky Line Limited between St. Louis and Chicago. Fokker Super-Universals are being used on this route. This route brought into effect the extra fare charge said to be the first in the history of aviation. The regular fare to Chicago is $30, but an additional $3 is now charged for the increased speed and added comfort on the new ships. Round trip fare is $62.

TRANSCONTINENTAL Air Transport, has established national headquarters in St. Louis. A personnel of twenty-two officers and assistants was brought here from Washington where headquarters was formerly located.

A NEW AIRPLANE service between St. Louis and Evansville has been announced by Interstate Airlines, Inc., which carries mail over that route. Planes leave St. Louis at 10:30 a.m. daily to reach Evansville at noon, and returning, depart at 1:10 p.m. to reach St. Louis at 3:00 p.m.

PLANS to open a Cleveland-St. Louis-Kansas City air passenger line, making connections east and west, which will create a transcontinental service have been revealed by the Universal Aviation Corporation, which is making a survey of the route. If promising possibilities for the proposed route develop from the survey, the line will be put into operation this summer. The schedule will be arranged to meet fast trains connecting at Cleveland to the East and Kansas City to the West.

PARKS AIR COLLEGE, south of East St. Louis, recently inaugurated new schedules in its transport pilots course. Under the new curriculum, the 150 hours given to students with limited commercial licenses to qualify them for transport rating will include ten hours of solo night flying and ten hours of flight in a cabin airplane with a passenger capacity of four or more persons. The school now has an enrollment of 709 students.

B. RUSSELL SHAW COMPANY, INC., airport engineering firm of St. Louis, has been employed to construct the new airport at Oklahoma City, Okla. The site for the field has been chosen and a bond issue for the airport will be voted shortly.

VON HOFFMAN AIRCRAFT CO. is completing a school hangar at the Lambert-St. Louis Field. This hangar is 80 by 120 feet with a lean-to the full length of the building. In this will be a general office, private offices, a large size schoolroom and a stock room. The building is of brick and steel construction with California stucco finish on the outside. B. Russell Shaw Company designed the hangar.

B. Russell Shaw also designed a hangar for the Von Hoffman concern at the St. Louis Municipal Airport. This hangar will have a 100-foot span and is 120 feet deep with a door opening 20 feet high.

THREE new courses have been added by the Guardian Air College of St. Louis in response to a demand for short courses specializing in certain branches of aviation. A ten weeks' course in airplane mechanics will permit a student to concentrate on this one phase of ground work, and arrangements have been completed to give intensive training on this subject which will qualify a student as an airplane mechanic. An eight-week engine mechanics' course will be devoted solely to engines. A special course of four weeks' duration has been instituted in aircraft welding.

TO accommodate the increase in student enrollments, ground school classes will be held at Parks Air College in morning and afternoon groups with the students divided into two sections for instruction purposes, it was announced recently by Oliver L. Parks, vice president and general manager of the institution. Division A will have classes from 9 a. m. to noon daily, and its members will take their flying work during the afternoon. Division B will take class work from 1 to 3 p. m. daily and will have its airplane work in the mornings.

ILLINOIS

[MRS. EDITH TILTON]

EAGLE SCHOOL OF AVIATION, formerly located at Hinckley, has been moved to the new Government landing field at Waterman. Dr. Henry J. Neubauer, owner and operator of the school, is making plans for a hangar and other building equipment in addition to the smaller buildings moved from Hinckley.

Three planes are included in the equipment of the Eagle school. A two-year-contract has been granted Dr. Neubauer at this new airport, which will be formally dedicated within a short time.

A MODERN airport one-half mile east of Dixon on the Lincoln Highway will be developed, provided the city of Dixon coöperates with Charles R. Walgreen, nationally known head of a chain of drug stores. The Barlow farm of 160 acres has been leased by Walgreen for ten years and necessary work to transform it into an up-to-date field will be started as soon as possible. The plans are outlined for a locally organized company to operate the field on a non-profit basis.

Walgreen is promoting the field for scientific, educational and experimental purposes, and it is hoped that a flying school may soon be established here. He proposes to share in the financing the habilitation of the port

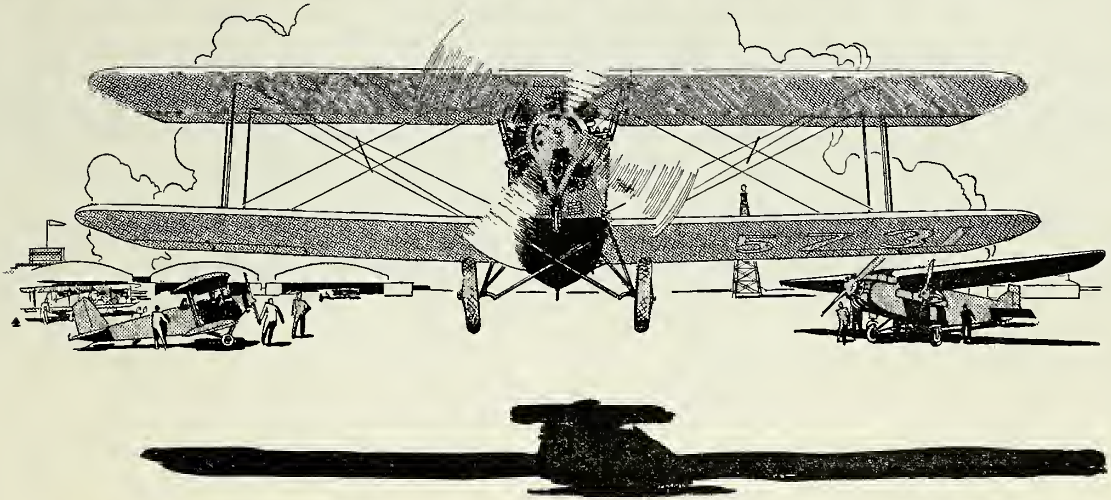
UNABLE to demonstrate a Bellanca plane satisfactorily at the Freeport airport recently, George Haldeman, accompanied by various members of the Henney Co. of Freeport, flew to Rockford to demonstrate the plane.

The Henney Company is planning the building of an air ambulance equipped with room in its cabin for patient, physician, nurse and two pilots. Running water and other necessities for patients are being planned. Two such ambulances will be built at once.

CONSTRUCTION on the new factory of the Wallace Aircraft Corporation on the 160 acres of land leased by the company on Harlem road will start soon, according to C. E. Thompson, president of the company.

THE first Rockford-built plane produced by the Acme Aircraft Corporation made its test flight recently. The plane, a two-place monoplane, was built for R. S. Link, Grand Rapids, Michigan. The new ship is of the parasol type powered by a Warner Scarab engine.

Thorough training is the background ▲ ▲ ▲



# of every polished pilot

New Planes—Spartan Training planes powered only with nine-cylinder, radial, air-cooled motors, are used exclusively in the Spartan School of Aeronautics. Planes and motors are inspected regularly by Government-licensed mechanics.

Army Instructors—The Spartan School instruction staff consists entirely of mature men holding transport pilot (the highest grade) government licenses, chosen because of desirable Army background and ability to impart knowledge to others.

Accommodations—Attractive student quarters fifty yards from the airport are maintained by the Spartan School at cost. Furnished rooms, reading rooms, showers and garage, meals at the airport dining room. An ideal arrangement for students.

A Great Airport—Tulsa's 400-acre municipal airport is the Spartan School training field. It has been laid out in accordance with modern, accepted airport requirements and is recognized as one of America's foremost municipal airport projects.

Factory Facilities—Spartan School students have access to the Spartan factory for information of importance to the progress of their actual flying. In the factory, students may study aerodynamics and airplane structure in its various stages.

Aviation Center—Four airports and a government meteorology station are factors involved in Tulsa's importance as an aviation center. Three passenger carrying lines, one using tri-motor Fords, and the air mail, operate from the Municipal Airport.

Write for full particulars

SPARTAN SCHOOL OF AERONAUTICS

Municipal Airport ◆ Tulsa, Oklahoma

CHICAGO

[BUDD MULLOY]

A SPECIAL business men's round trip service between Chicago and Detroit has been inaugurated by the Stout Air Lines, the planes leaving here at 8:30 a. m., allowing the passenger five hours in which to transact his business in the Michigan city and bringing him home in time for dinner.

THE Curtiss company has opened its hangars at the new field at Glenwood, Ill. The company plans to operate an air shuttle service between the field, which is some distance from the heart of the city, and the lake front. Amphibion planes will be used in the shuttle service.

THE *Untin Bowler*, Col. R. R. McCormick's Sikorsky amphibion, has been pressed into service by the Chicago *Tribune* in its campaign to interest readers in the possibilities of aviation. The plane makes daily trips to parts of the country within half a day's run, the landscape and activities of the natives being reported in detail by Robert Wood, a reporter.

JOSEPH V. CRANDALL, who enjoys the reputation of being perhaps the best known local airplane photographic expert by reason of his experience during the war and since, has joined the Aviation Service and Transport as director of the photographic department.

LEONARD MACOMBER, INC., opened its Michigan avenue office here recently and announced that it is ready to design any kind of an airport for any city in the country.

CAPTAIN J. C. BRYAN, designer of the Bryan B-1 plane, recently resigned his position on the Greer Airways faculty and is now devoting his time to private interests.

ANNOUNCEMENT has been made by the Boeing System that it will inaugurate its Oakland-San Francisco-Chicago passenger service some time this summer. Twelve multi-motored 18-passenger Boeing planes are being finished at Seattle.

A NUMBER of public spirited private plane owners have asked that the police department call upon them whenever planes are needed in pursuing criminals. A kidnapping ring was broken up here recently when a citizen loaned his plane to the police and the returned victim pointed out from the air the spot where he had been held captive.

NATIONAL AIR TRANSPORT'S new hangar at the Chicago municipal airport has been completed. The new hangar is 120 feet deep with a 160-foot clear span. The large size and the clear span construction of the new hangar makes it possible to house from fifteen to eighteen mail and express planes under its roof, leaving room for service crews and inspectors to work unhampered.

DAN W. JONES was elected president of the Universal Aviation Corporation at a recent meeting of the company's executive committee. Mr. Jones resigned as vice president of the Mississippi Valley Trust Company to take up his new duties, relieving Mr. Louis H. Piper, who, because of ill health, becomes chairman of the board. Mr. Piper will remain as active in the affairs of the company as his health will permit. Mr. Jones is a son of the late Breckinridge Jones, president of the Mississippi Valley Trust Company.

Universal Schools Insure Students

UNIVERSAL AVIATION SCHOOLS will offer life and disability insurance policies to their flying students as the result of a recent agreement made by the Universal Aviation Corporation with the insurance firm of Clark and Guinotte of Kansas City. The cost of the insurance to the student will be $20 for a $1,000 policy or $45 for a $2,500 policy.

BLOXHAM AERO SUPPLY CO., of Chicago, producers of Bloxham Safety Sticks and Perfection helmets, have appointed two distributors in the Chicago area, Aeroplanes, Inc., and Aviation Service and Transport. The Tahoma Airplane Corp., of Elgin, Illinois, has signed a contract for the Bloxham Safety Sticks as standard equipment for their training planes.

Universal Acquires Porterfield Flying School

UNIVERSAL AVIATION CORPORATION recently purchased a controlling interest in the Porterfield Flying School, Inc., located at Fairfax Airport, Kansas City, which will be included in the chain of Universal schools. Universal officials announce that they will start construction of new hangars at Fairfax Airport, Kansas City, to enlarge the school. All of the equipment, including the present hangar and six American Eagle training planes, was included in the transaction. Additional planes will be brought in, a downtown ground school will be opened and a complete course of instruction, including flying, and business courses will be included.

MORROW KRUM has been made a vice president of Leonard Macomber, Inc., airport engineers of Chicago. Capt. Harold H. Ambler has been named first vice president of Leonard Macomber, Inc. During the war Capt. Ambler built Orly, France, one of the largest aircraft depots built by the Air Service at that time.

CONSTRUCTION of a new steel hangar, 100 feet square, at Pal-Waukee Airport, Palatine and Milwaukee Roads, Chicago, was started on May 6 by Leonard Macomber, Inc., airport engineers. The new hangar is the first unit of a new construction program announced for the Pal-Waukee field.

SOUTH DAKOTA

THE Rapid Air Lines, Inc., have ordered another Ryan B-5 Brougham for service on their daily passenger route from Rapid City to Huron, which is the western leg of the plane-train hook-up with the Chicago and North Western Railway. The officials of both companies express gratification at the volume of business with which the new service has been favored since its inauguration on May 1st.

THE Rapid Air Lines, Inc., distributers for Eaglerocks for North and South Dakota and Wyoming, have added to their territory the state of Nebraska.

The 600 h.p. Hispano-Suiza engined Bernard Transatlantic monoplane, Type 181, at Roosevelt Field, L. I., N. Y.

PARTS—SERVICE

Some Robertson Bargains

Oil Pressure Gauge. Especially suited for aircraft purposes. Ruggedly constructed, thoroughly reliable, moisture proof and dust proof, finished in black enamel, non-corrosive movement. 0-120 pounds ..... **$1.50 each**

Combination Spinner and Spinner Cap for Radial Motors. Especially designed to stay on indefinitely. Firmly attached by a series of screw plates which fasten directly to the hub in front and rear of propeller. Made of heavy gauge aluminum. Nicely finished. Will fit any type propeller or plane. Give hub dimensions, make of motor, plane and type of propeller when ordering. .... **$16.00 each**

Aluminum Wheel Discs. Light and staunch. Accurately die-stamped. Grooved and arched for rigidity. Perfectly matched 26 x 4 wheel size **$1.50 per disc**

N. A. C. A. Cowlings. Correctly designed according to the specifications of your motor and plane. Made according to the original designs adopted by the N. A. C. A. When ordering, give complete information and specifications of your plane and motor. Priced from **$50.00 to $150.00**

Official Wright Whirlwind Parts Dealers and Maintenance and Repair Depot. All Whirlwind parts ready for immediate shipment at standard factory prices. Territorial distributors for Curtiss-Robin and Travel Air.

The most complete stock of parts and supplies in the industry. Efficient Service for transients.

Located in the center of the United States, this is a complete aeronautical supply house that gives speedy service to every part of the country.

And not only does it offer a most complete stock that includes every known part, supply, and accessory you will ever need, but it offers the utmost in dependability—only AN and popularly accepted commercial standardized materials are offered.

It is the logical source for you to consult when you need aeronautical supplies—for here the manufacturer, dealer, operator, and aviator are served with their complete equipment, though their wants vary from propeller to controls . . . or from fabric to tubing.

And, by serving the entire industry for upwards of ten years, a steady, heavy business volume has been established lowering all prices considerably.

NOW! *A New Catalogue*

The new catalogue, just recently issued, gives you an honest picture and description of every aeronautical part and supply—bolts, nuts, clevis pins, propellers, Curtiss OX-5, OXX-6 and Hispano-Suiza motors and parts, wheels, tires, fabric, instruments, flying equipment.

You will find it an authoritative guide. Send for your copy today.

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ROBERTSON AIRCRAFT CORPORATION

Lambert - St. Louis Airport, Anglum, St. Louis County, Missouri
Phone AVery 2725

N 530

A DIVISION OF THE UNIVERSAL AVIATION CORPORATION

OHIO

[T. E. LUNSFORD]

CITY aid in establishing a municipal airport has been asked of the Alliance City Council by C. H. Mooney, office manager of the Alliance Aircraft Corp.

THE contract for the manufacture of the door-operating mechanism to be installed on the dirigible hanger now being built at the Akron municipal airport by the Goodyear-Zeppelin Corp., has been awarded to the Wellman-Seaver-Morgan Co., of Cleveland.

PLANS and specifications for a $300,000 housing program for Wright Field, Dayton, has been announced by the War Department at Washington. Bids will be advertised within the next few months.

A NEW type of low-powered monoplane, built by Harold Johnson, proprietor of the Johnson Welding Co., of Akron, has been tested at Stow Field. The power plant is a Model A Ford motor. The only changes from the original are a special distribution system and dual ignition for each cylinder.

A BIG aviation program for 1929 for the new $50,000 Ohio Air Transport Co., of Youngstown, which will operate sightseeing, student-training, airplane sales, and aerial taxi service at Lansdowne Field, has been announced by W. Edgar Leedy, Jr., who is heading the company. Leedy will have the Ohio sales agency for the Argo, built by the Alliance Aircraft Co.

REMOVAL of the last hindrance to complete development of the Akron municipal airport project has been announced by Service Director Fred Swineford, member of the Akron airport board. The city has obtained title to the last remaining piece of land on the airport site from the estate of the late M. O'Neil and the General Tire and Rubber Co.

FIVE Waco 22 taper-wing biplanes made by the Advance Aircraft Co., of Troy, Ohio, were boxed and shipped recently to the Chinese Aviation Bureau at Canton, China. The planes will be used for the advanced training of Chinese pilots. All were 3-place planes powered by Wright Whirlwind 220 horsepower engines.

CLEVELAND

[M. MIRVIS]

A GROUP of Cleveland advertising managers, publicity and newspaper writers and public relations experts has been named by the Cleveland National Air Race and Show Corp., to assist the show management in publicizing the events planned for Cleveland August 24-September 2. A grandstand to seat 30,000 spectators will be built at Cleveland Airport for the National Air Races. A general operations building and three large hangars will also be completed by the time of the races. Parking space for 50,000 machines will be provided.

Indicating the large attendance at the races is the early report of the Hotel Cleveland management that 40 per cent of their guest rooms have already been reserved by those expecting to be in Cleveland for the event in the late summer.

By mid-May 81 exhibitors had signed for space at the Cleveland Air show, according to Clifford Henderson, show manager.

CURTISS FLYING SERVICE, INC., is clearing a 140-acre plot at Wilson Mills and Lander roads, in Mayfield Village, a Cleveland suburb. A 100 by 120-foot hangar is planned. A building where school activities will be concentrated will also be included in the layout. Herrick Airport will be the name of the Curtiss flying field here. The field has been named in honor of the late Ambassador Myron T. Herrick of Cleveland.

V. E. JAKL, meteorologist in charge of the Cleveland Airport weather bureau, has been transferred to Fort Crook, Omaha, Nebr. C. G. Andres, of Hadley Field, N. J., has taken Jakl's place here.

CLIFFORD GILDERSLEEVE, manager U. S. Air Lines, has removed his office from the Union Terminal Building to Cleveland Airport. The U. S. hangar is rapidly nearing completion and operations are expected to begin in mid-August. This company proposes to operate passenger lines connecting Cleveland, Columbus and Cincinnnati.

SKYWAYS, INCORPORATED, supplied the plane which acted as pathfinder for the Michigan Air Tour, visiting the Michigan cities to make arrangements for the reception of the tour. Bill Atwell piloted the Stearman plane of Skyways over the state.

ORDERS for airplanes totaling $730,000 were received recently by the Great Lakes Aircraft Corporation of Cleveland, according to Charles F. Van Sicklen, vice president of the corporation in charge of sales. North Atlantic Aviation, Inc., of Boston has contracted for 50 of the training and sport biplanes, model 2T-1, and 40 of the sport pursuit biplanes, model 2T-2 and ten twin-motored amphibions. North Atlantic Aviation will act as the Great Lakes Aircraft Corporation distributor in the New England area. The Vance Flying Service of Great Falls, Montana, has ordered 30 of the 2T-1 planes. The Vance distributorship covers Montana and Wyoming.

MAJOR P. G. KEMP of Chicago, Great Lakes distributor, recently placed an order for 125 airplanes with the Great Lakes Aircraft Corporation of Cleveland, it was announced by Charles F. Van Sicklen, vice president in charge of sales. The order calls for 50 trainers, 50 sport pursuit planes and 25 twin-motored amphibians.

Major Kemp's distributorship for the corporation has been increased to include Wisconsin, Minnesota and the northern peninsula of Michigan.

COLUMBUS

[W. D. WALTER]

C. L. MORRIS, president of the Aero Club of Columbus, presided at the ceremonies attendant upon the laying of the corner stone of the administration building at Port Columbus, on April 18th. The trowel was wielded by Mayor James J. Thomas. Brief speeches were made by Service Director Duffy, who is in direct charge of the construction of the airport, City Attorney Leach, Council President Wehe, Councilman Floyd Green, Ralph C. Kempton of the Allied Architects Association, Warner P. Simpson, and John E. Davis, former president of the Aero Club.

We believe John Davis ably expressed the sentiment of the Aero Club when he stated that this airport is the realization of the original members of the club—that small group of flying officers who, just returned from the Army, tried in every way to interest the public in aviation, and met with but little success. For years we have plugged along, in the face of an apparent total lack of interest on the part of the public. Solely through the efforts of the Club, Norton Field was established in 1923, and this was the beginning, a step forward which, Mr. Davis believes, is largely responsible for the huge modern airport which will soon put Columbus on the aviation map. This writer is proud to have been one of that original group of believers in the future of aviation.

CONSTRUCTION work at Port Columbus has been somewhat hampered by unfavorable weather conditions. Considerable progress has been made, however, during the past few weeks. Steel work for the T. A. T. hangar is nearly finished. Radio towers for T. A. T. have been erected, and equipment will be installed immediately. Concrete is being poured for the runways, the hangar aprons, and the station platforms. The drainage system is almost completed, as is the installation of the electrical conduit for the field lighting. Council has passed appropriations for the work incidental to seeding and sodding the field proper, for the implements necessary for proper maintenance of the turf, and for fencing the field. Bids for the restaurant and refreshment concession, to be located in the administration building, will be opened within two weeks.

THE city council has granted to Curtiss Flying Service exclusive flying school rights at Port Columbus. Several other organizations have petitioned for franchises to establish schools, but the council holds that for the present, at least, it is preferable to have only one concern handling instruction at the field.

THE manager for Port Columbus has not yet been selected by the city council. Several men are under consideration, among whom possibly the best known is Captain William F. Centner, Air Corps Reserve, now with the Airways Division of the Department of Commerce.

Why We Give the *Best* Training at the *Lowest* Cost

Our prices are low because we have . . . .

- NO lost days—no Winter close downs
- NO heating costs
- NO field rental
- NO high priced, non-producing executives
- NO student breakages from insufficient training
- NO costly mistakes in equipment due to inexperience.

But we give the highest type of training because we have . . . .

EFFICIENT MANAGEMENT AND INSTRUCTION under owners who have continuously operated at a profit for ten years in commercial aviation, manufacture, transportation and training.

EXPERT LICENSED INSTRUCTORS in flying and mechanics.

AMPLE, UP-TO-THE-MINUTE, LICENSED EQUIPMENT.

STUDENTS ACTIVELY ENGAGED under skilled foremen in production of airplane parts, motors and motor parts for factories and dealers.

REGIONAL REPAIR AND DISTRIBUTION depot for airplane motors and parts with a large stock on hand, thus reducing our own costs and furnishing valuable experience to students and covering school overhead.

HONEST, SINCERE INSTRUCTION and real personal interest in each student's welfare.

BORDER LIGHTS, FLOOD LIGHTS AND BEACON for night flying instruction.

ALL-WEATHER, HARD, SURFACED RUNWAYS.

FREE EMPLOYMENT SERVICE.

We do not pretend to guarantee positions, but we have more calls for men trained in our schools than we can supply. We keep faith with our students.

Railroad fare refunded to Commercial and Transport students.

Southern Airways Schools

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AVIATION AND MOTOR SCHOOL
Affiliated with
SOUTHERN AIRWAYS, INC.

Our Prices:

Home Study Course	$15
Practical Shop Course	50
Ten Hour Course	150
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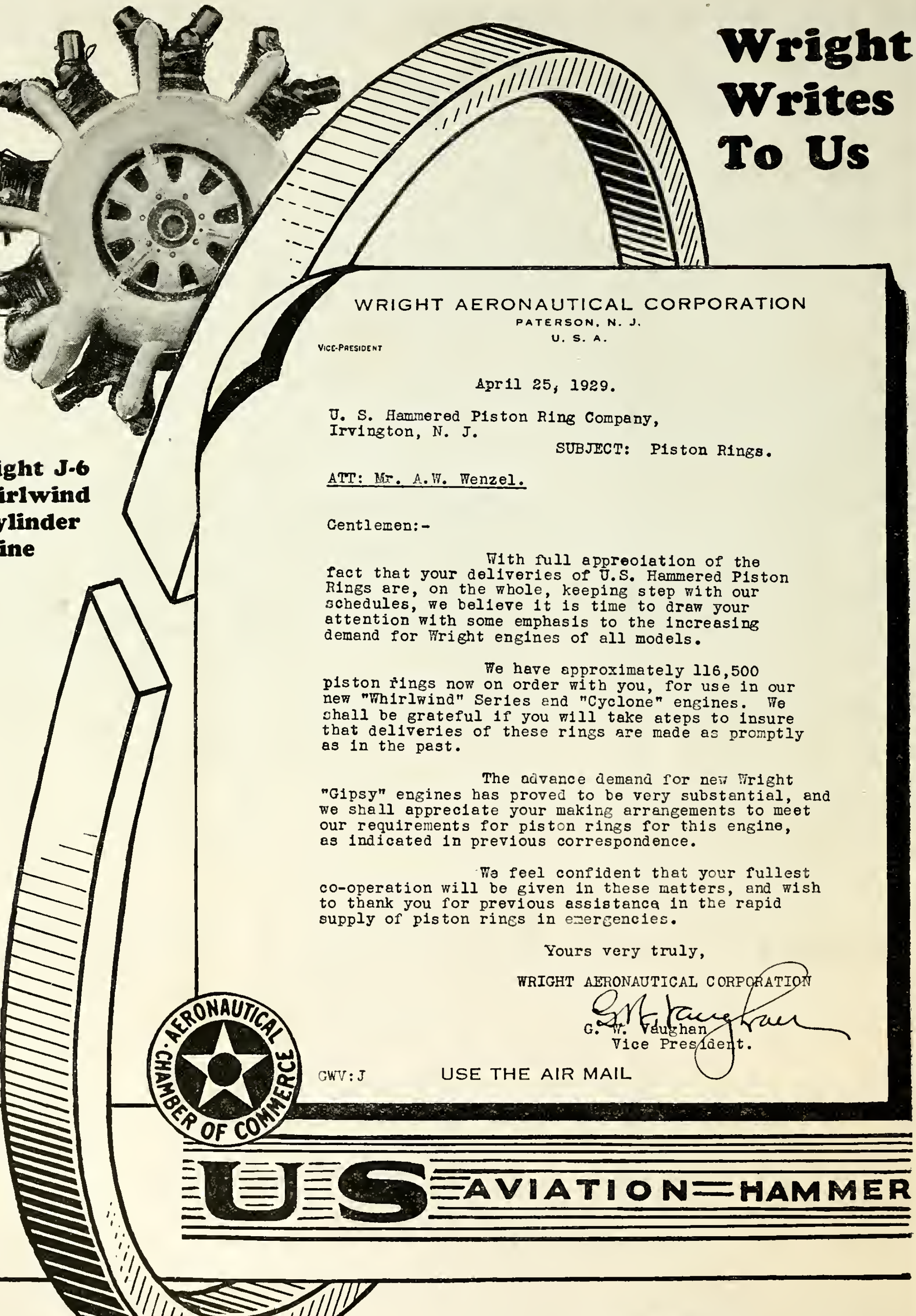


Wright J-6 Whirlwind 9-Cylinder Engine

WRIGHT AERONAUTICAL CORPORATION
PATERSON, N. J.
U. S. A.

VICE-PRESIDENT

April 25, 1929.

U. S. Hammered Piston Ring Company,
Irvington, N. J.
SUBJECT: Piston Rings.

ATT: Mr. A.W. Wenzel.

Gentlemen:-

With full appreciation of the fact that your deliveries of U.S. Hammered Piston Rings are, on the whole, keeping step with our schedules, we believe it is time to draw your attention with some emphasis to the increasing demand for Wright engines of all models.

We have approximately 116,500 piston rings now on order with you, for use in our new "Whirlwind" Series and "Cyclone" engines. We shall be grateful if you will take ateps to insure that deliveries of these rings are made as promptly as in the past.

The advance demand for new Wright "Gipsy" engines has proved to be very substantial, and we shall appreciate your making arrangements to meet our requirements for piston rings for this engine, as indicated in previous correspondence.

We feel confident that your fullest co-operation will be given in these matters, and wish to thank you for previous assistance in the rapid supply of piston rings in emergencies.

Yours very truly,

WRIGHT AERONAUTICAL CORPORATION

G. W. Vaughan
Vice President.

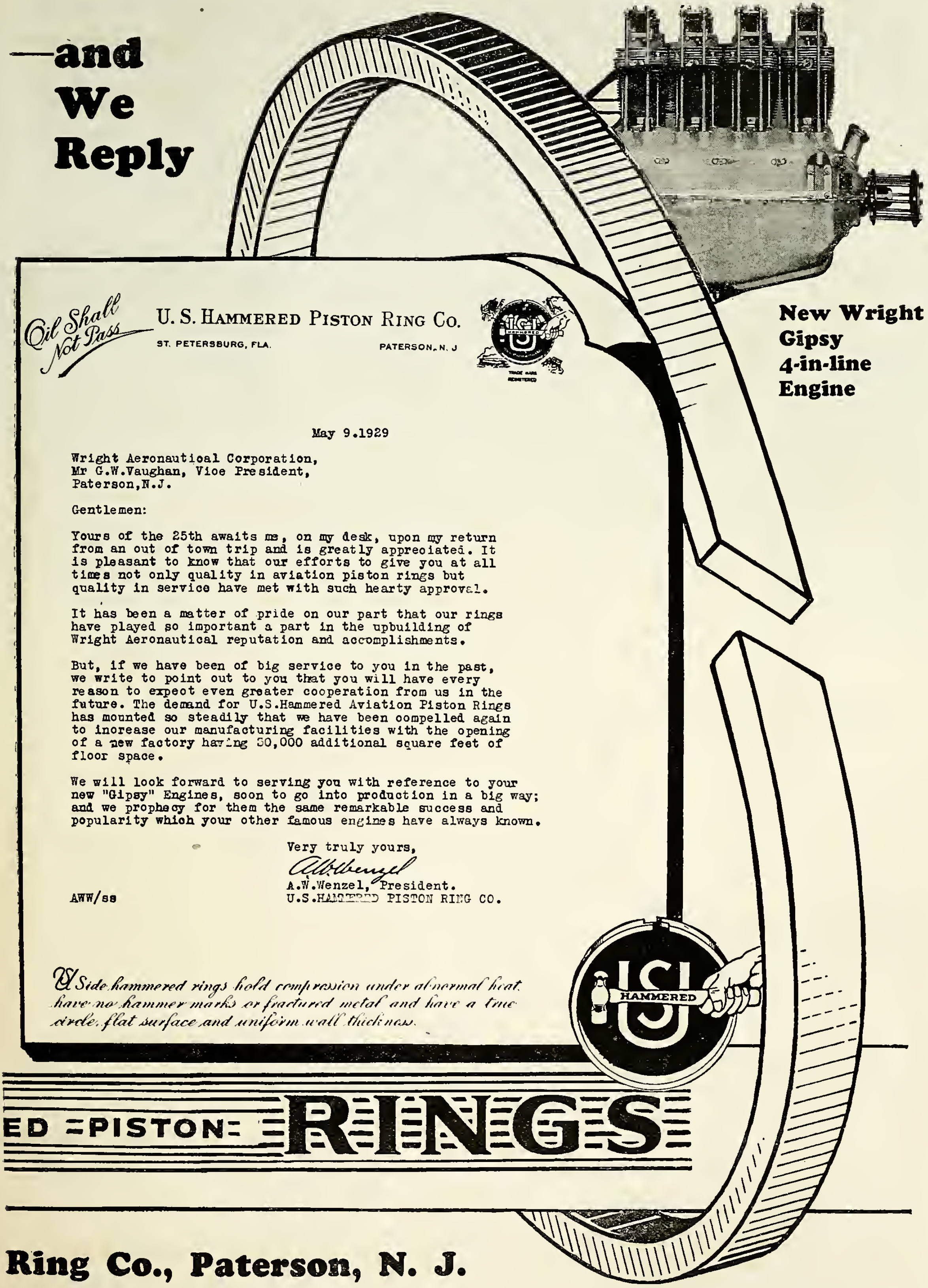
GWV:J

USE THE AIR MAIL

AERONAUTICAL CHAMBER OF COMMERCE

US AVIATION HAMMER

U. S. Hammered Piston



—and We Reply

New Wright Gipsy 4-in-line Engine

Oil Shall Not Pass

U. S. HAMMERED PISTON RING CO.

ST. PETERSBURG, FLA. PATERSON, N. J

May 9.1929

Wright Aeronautical Corporation,
Mr G.W.Vaughan, Vice President,
Paterson,N.J.

Gentlemen:

Yours of the 25th awaits me, on my desk, upon my return from an out of town trip and is greatly appreciated. It is pleasant to know that our efforts to give you at all times not only quality in aviation piston rings but quality in service have met with such hearty approval.

It has been a matter of pride on our part that our rings have played so important a part in the upbuilding of Wright Aeronautical reputation and accomplishments.

But, if we have been of big service to you in the past, we write to point out to you that you will have every reason to expect even greater cooperation from us in the future. The demand for U.S.Hammered Aviation Piston Rings has mounted so steadily that we have been compelled again to increase our manufacturing facilities with the opening of a new factory having 30,000 additional square feet of floor space.

We will look forward to serving you with reference to your new "Gipsy" Engines, soon to go into production in a big way; and we prophecy for them the same remarkable success and popularity which your other famous engines have always known.

Very truly yours,
AWWenzel
A.W.Wenzel, President.
U.S.HAMMERED PISTON RING CO.

AWW/ss

U.S. Side hammered rings hold compression under abnormal heat, have no hammer marks or fractured metal and have a true circle, flat surface and uniform wall thickness.

USJ HAMMERED

ED PISTON RINGS

Ring Co., Paterson, N. J.

SCHOOLS

LEARN to FLY

At a CURTISS SCHOOL

The new Curtiss course is now ready. It was prepared for you by civil and military experts. It is standard at each of the 35 Curtiss schools. It is conducted solely by instructors who have taken the special Curtiss Instructors' Course.
In this splendid modern course only the finest equipment is used—including the highest priced training planes.
Avail yourself of this first-class training and properly prepare for a high place, in the fascinating business of aviation.

Flying school courses for those seeking private, commercial or transport flying licenses. Ground school courses given with all flying courses are also offered separately. Those over 16 are invited to write for information.

CURTISS FLYING SERVICE

"World's Oldest Flying Organization"

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offers you courses designed after nine years of experience in teaching others to fly. Complete mechanical course with every flying course. Instruction given in open and cabin planes on blind flying, night flying and cross country navigation and flight. Every flying course prepares you for Federal Examinations for a government license. Write for free catalog No. 18.

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TIPTON, PA.

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HOME STUDY COURSES
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AIRPORT MANAGEMENT
AERONAUTICAL ENGINEERING
GROUND SCHOOL OF AERONAUTICS
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Affiliated with T. C. Ryan Flying School
Write for Catalog

CHALLENGER FLYING SCHOOL
Get Your Training
where Challenger airplanes are built!
Ideal field Let us lay the foundation for your success.
Challenger Flying Service, Inc.
Hagerstown, Maryland

DETROIT

[FRANK BOGART]

ACQUISITION of the Stout Air Services, Inc., by United Aircraft and Transport Corporation and the announcement that the Aircraft Development Corporation will absorb the Mahoney-Ryan Aircraft Company at St. Louis constituted the most important news in Detroit air circles during May.

The original group that backed William B. Stout in the Stout Metal Airplane Company and in the air transport venture, is now in part associated with him in Stout Engineering Laboratories, Inc. This concern will be devoted principally to aeronautic research.

Others of Stout's backers have entered with him into a new air transport concern to be known as the Detroit and Cleveland Stout Air Lines, Inc., which will operate Dornier Wahl metal-hulled flying boats on the Great Lakes. It is also possible that the Stout interests may acquire patent rights to build these machines in the United States, A. A. Schantz, president, has announced.

The Aircraft Development Corp. expansion and merger with Mahoney-Ryan presages greater activity on the part of the Detroit concern in the metal flying boat and seaplane field, the directors say. It is rumored that other companies will be taken in soon, these steps all being part of the plan that was announced in April by Edward S. Evans, William B. Mayo, Harold H. Emmons and their associates in the Detroit Aviation Society to form a $5,000,000 syndicate for the purpose of expanding Detroit's aircraft production activities.

A. D. C. is spending $200,000 on its airport and seaplane harbor and will have more hangars and beacon lights installed by July 1, when it is expected this port and the municipal airport both will be declared international ports of entry by the Treasury Department.

THE Verville Aircraft Corporation, which showed its four-passenger coach for the first time at the show here in April, will begin deliveries by July 1, says Alfred V. Verville. Factory space has been taken on Melville Avenue, and Verville says that at least 100 planes will be built in June and July.

THE Detroit Air Yacht Club now has three planes for instruction of its membership, two Gipsy Moths and a Stearman. The ships are housed at the municipal airport, where a small hangar for 12 ships was recently completed. The big 240,000 square foot hangar and administration building is expected to get under way soon. Warren Packard, founder of the Air Yacht Club, was re-elected commodore for the coming year. Captain L. M. Woolson is vice commodore; Louis Huck and Fred Brossy, rear commodores, and secretary and treasurer, respectively. William Lees is chief test pilot for Packard and working closely with Captain Woolson, designer of the Packard Diesel engine, which on May 14 completed a 700-mile test flight from Detroit to Langley Field, Va., at a fuel cost of only $4.68.

Detroit-Cleveland Amphibion Service

THE Thompson Aeronautical Corporation of Cleveland on May 14 inaugurated its amphibion service between Cleveland and Detroit, with Amelia Earhart and Captain Frank Courtney of England as guest pilots. On the initial flight the Keystone-Loening amphibion was forced down by heavy fog and rain while crossing Lake Erie. After alighting the plane taxied for thirty miles on the water, and when the fog lifted it took off and completed the run to Detroit. The company gives 55-minute service and operates four round trips daily.

SCHOOLS

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THE oldest and most famous field of all. Where Lindbergh, Chamberlin and Byrd started from. One of world's *safest* fields. And only 45 minutes from New York. Brand new planes by Fleet, designer of army and navy training planes. Instruction supervised by Lieut. Warren R. Carter on leave from Brooks Field. Student personnel carefully selected. *Write* Lieut. Col. N. J. Roots, Roosevelt Aviation School, Inc., Mineola, L. I., N. Y.

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Immediate Acceptance *from Coast to Coast!*

From Maine to California the Barling NB3 has met with a reception that points the way to a new standard of air-craft performance and construction.

The day of excess weight in order to preserve rigidity is over. The Barling has proved that strength and all-metal structure are practical in a very light plane. The NB3 wing has supported more than 6½ times the weight of the entire plane. It gives performance from a small Le Blond 60 that would be remarkable in a plane of twice its power! Over 100 miles per hour! 1200 feet in the first minute! Landing speed of 30 miles per hour!

The new-day design and application of the dihedral angle gives uncanny maneuverability and safety. Other light planes give trouble in rough air. The NB3 is steadiness itself—in any air.

With no other all-metal three-place monoplane in the United States selling for less than ten thousand dollars, the NB3, because of quantity production, is sold fully equipped for $3600 fly-away Marshall.

Dealer franchises are still obtainable in some territories. Financially responsible dealers who are interested should address our Manufacturing Division.

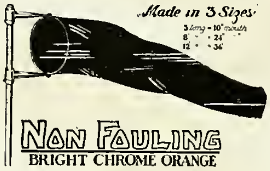
NICHOLAS-BEAZLEY AIRPLANE CO., Inc.
Manufacturing Division, MARSHALL, MO.

BARLING NB3
Monoplane

EQUIPMENT

The
Budd Wheel
Company
Makers of Wheels
for airplanes

Philadelphia and Detroit



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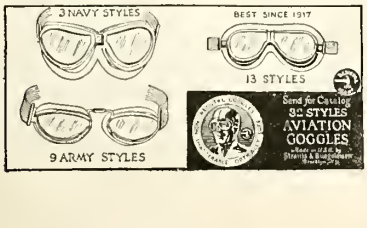

MINNESOTA

[LYLE F. YOUNGSTROM]

AS we go to press, St. Cloud has completed plans for an air meet to be held in conjunction with the formal opening of its new municipal airport, May 23, 24 and 25.

Runways, hangar sites and equipment were placed and finished by May 18. The port, which comprises 143 acres donated by Mrs. A. G. Whitney, has been leveled off, and the seeding and rolling of the field is completed. A lighting system is contemplated, and an attendant will be stationed at the field, which is located two miles southeast of the city. St. Cloud is the fourth largest city in Minnesota.

J. P. O'Brien, of the Air-O-Ways Development Company, St. Cloud, and Bill Brinkman are arranging the meet, with the backing of St. Cloud city officials and park board. Those making arrangements in addition to Mayor Murphy are Allen Atwood, Albert Guy, Victor Fandel and Harold Schoelkopf.

The derby events will include various classifications of closed triangle races, spot and dead stick landings, stunting, parachute jumps, formation flying, and other features.

Plane manufacturers and dealers in accessories have reserved space for exhibits.

FLYING time on the Twin Cities-Chicago air mail line operated by the Northwest Airways has been reduced by half an hour under new schedules. The new schedules follow:

Eastbound planes leave Minneapolis at 9 a. m.; St. Paul at 9:15 a. m.; Rochester, 10:10 a. m.; and arrive at Chicago 12:55 p. m. Westbound planes leave Chicago at 3 p. m.; arrive Rochester at 6 p. m.; St. Paul 6:45 p. m. and Minneapolis, 7 p. m.

Afternoon air mail schedules are as follows:

Eastbound, leave Minneapolis 2:45 p.m.; St. Paul, 3:04 p.m.; and arrive Chicago 7:25 p.m. Westbound, leave Chicago 6:10 a.m., arrive St. Paul, 10:40 a.m.; Minneapolis, 10:50 a.m.

Twin Cities-Kansas City Airline

YELLOW Cab Airways, Inc., of Des Moines, inaugurated an air passenger line from the Twin Cities to Kansas City by way of Des Moines in May.

Two six-passenger cabin planes are used on the line. Planes leave Kansas City at 8 a.m., Des Moines at 10 a.m., and arrive in the Twin Cities at 1 p. m. The return trip starts at 2 p. m., with the Des Moines stop at 5 p. m., and Kansas City at 7 p. m. The services will be daily except Sunday.

INSTALLATION of radio equipment will begin June 1 as another safeguard of air transport between the Twin Cities and Chicago, it was announced by Colonel L. H. Brittin, vice president and general manager of Northwest Airways, following official notice that establishment of a Government radio station in La Crosse had been approved.

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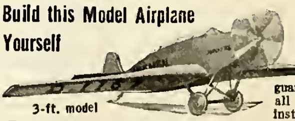

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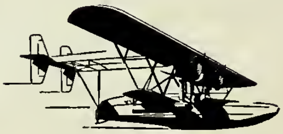

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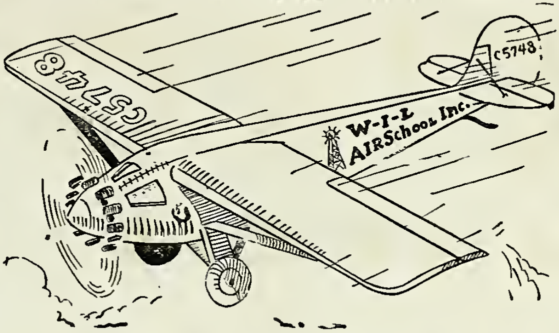

Schools to train men for aviation have sprung up everywhere, almost over night; they are many and varied. W-I-L Air School is new, but it combines all that is best. No haphazard, experimental training is given at W-I-L. The faculty is composed of men whose ability and experience are unquestionable.

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TITANINE
AIRPLANE FINISHING MATERIALS

THE GLIDER MOVEMENT

(*Continued from page* 49)

flight of from four to five hundred feet. Gliders can also be launched on an airport behind an automobile. Kiting the glider into the air behind the car, the pilot releases the rope (not shock-cord) at any height desired, and glides back into the field. At recent demonstrations by University of Michigan students at Ford Airport in Detroit, pilots went as high as 400 feet before turning loose from the rope. This system teaches only the use of the controls (which are standard on all gliders recommended by the National Gliders Association) and is of no value for training for soaring because there are few if any up-winds prevailing over level terrain.

For preliminary gliding by the shock-cord method, a small hill or knoll of from twenty to fifty feet in height is preferred. The slopes should face all directions so as to enable the pilot to avail himself of the wind blowing at any particular moment. (Gliders are always launched into the wind.) The slopes should be free of obstacles. This form of terrain is easily found close to the average American community.

For soaring, a ridge is more preferable than a hill, since wind blowing across a valley strikes the ridge and is deflected upward, creating the zone of the up-wind. This zone is obviously as wide as the ridge is long, and the wider the zone, the more opportunity the pilot has to stay in the air, flying figure eights back and forth through the zone. Obviously the ridge should face the prevailing wind, and if a ridge can be found with suitable slopes in both directions, so much the better. Of course, the lower slopes of the ridge can be used for simple gliding also. The higher slopes do not have to be quite as free of obstructions as the lower slopes providing there are landing places here and there, for the soaring pilots should be able to choose and reach his landing place with far greater accuracy than the beginner.

There is yet a great deal to be done by the association before its work can equal that of the Rhoen-Rossitten society. The technical problems are being handled by a committee consisting of Dr. Wolfgang Klemperer of the Goodyear-Zeppelin Company; Professor Alexander Klemin of the Daniel Guggenheim School of Aeronautics, New York University; Professor F. W. Pawlowski of the University of Michigan; Professor Peter Altman of the

(*Continued on next page*)

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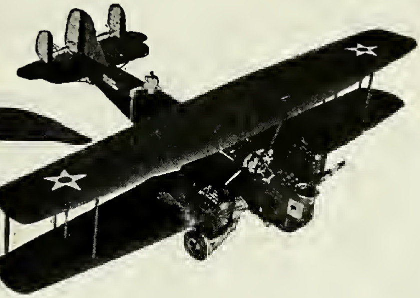

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Ask yourself this question: What will the aviation industry amount to in a year or so? And you know the answer—it will be America's most gigantic industry.

And question number two: Isn't it logical to assume that the men who get into aviation now will grow with the industry and be among the leaders "tomorrow?" We all know that to be so.

Even today, though aviation is still in its infancy, there is a big demand for pilots, for men in aviation factories—air transport companies—passenger and express service—air mail—barnstorming—aerial photography, motion picture work, crop dusting, etc. Opportunity! Fellows, aviation teems with it. Reason it out for yourself: thousands of passengers and tons of mail and freight are now being swiftly and safely carried all over the country daily. Manufacturers are all behind in supplying the demand for airplanes. Why? Because there are not enough men ready to step in and function in the various branches of the industry.

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You receive the constant help and guidance of an Advisory Staff, composed of men in the manufacturing, maintenance and flying branches of the industry. Then, whether you want a job on the ground or in the air, you receive the help of an efficient Employment Service, without charge.

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Heed the call of Aviation for trained men. Prepare yourself now, while the Big Pay Jobs are looking for you.

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(*Continued from preceding page*)

University of Detroit; Eddie Stinson; A. V. Verville and Captain L. M. Woolson.

The conducting of contests and the licensing of pilots are in charge of the contest commitee, consisting of Ray Cooper, a member of the contest committee of the National Aeronautic Association as chairman; Carl F. Schory, formerly secretary of the National Aeronautic Association contest committee; W. J. Scripps, Dr. Klemperer and Professor Altman.

There are two glider clubs in Detroit, and there is one club in each of the following cities: Portland, Ore.; Seattle, Wash.; Breckinridge, Texas; Kansas City, Mo.; Cincinnati, Ohio; Cleveland, Ohio; Rochester, N. Y.; and New York City. At the University of Michigan the glider section is an important part of the Aeronautical Society. A dozen more clubs are being organized, and over 1,000 inquiries have been received from every state in the Union. There are over forty individual members of the association.

Over thirty students, including two women, have flown at the University of Michigan. Twelve of these are trying for their licenses and one, M. F. Stoughton, has made the grade. Many flights have been made by the California Glider Club; and three pilots, one a woman, have passed the examinations for third class licenses. There has been a great deal of gliding in Seattle, where Thomas D. Stimson has flown one of the two American soarers for a half hour. Gliding is progressing well at Cincinnati, both by the club and at the school. Akron is enjoying gliding with Dr. Klemperer himself as coach. Test pilots for Gliders, Inc., have flown all over the hills at Orion and have had as their guests, actually flying, Miss Amelia Earhart, Major Reed G. Landis, Earl Osborn, Frank Hawks and many other famous pilots. Clarence N. Cook has an American designed and built glider at Kansas City, Kan., which has been flown by many interested in aviation, including Fred Harvey. E. T. Akin has thrilled Breckinridge, Texas, by flying minus a motor. As the newer clubs get into the air with their equipment, the actual number of flights per month will probably be multiplied by five before the summer has passed. The University of Detroit group will test its glider before this is published. The Albatross Club of Detroit is also nearly ready to start activities. Gliding will be demonstrated in or near New York City by Memorial Day. There Anthony Fokker, builder and pilot of the first two-seater in Germany, is lending a helping hand. William H. Bowlus of San Diego, Calif., has already flown a soarer along the cliffs overlooking the Pacific.

Gliding is established in the United States. What its future will be is hard to predict, but when Americans, and particularly American pilots, go out to win—well, at least it is interesting.

LIFE OF A FLYING CADET

(*Continued from page* 41)

Another table taken out of the mess hall.

Ground School is over? ? ? ? ?

Final check. Report to Flying Office. Lie around all day. Couldn't get to you today. Report back next day. You report back next day. Final Test Pilot comes out; calls your name; tells you what to do. Main thing is to *fly*. You climb into the ship. It has a number and two

(*Continued on next page*)

FIRST PRIVATE FLYERS MEET

COLORADO SPRINGS, AUGUST 9-10-11

COLORADO SPRINGS FLYING CLUB

—offers their first annual sporting air tournament in the shadow of Pikes Peak and amid the most beautiful scenery in America.

PRIVATE FLYERS' EVENTS

Silver cups for lovers of pure sport flying.

FLYING CLUB EVENTS

A magnificent silver cup to the club winning greatest number of points in the schedule of events.

FLYING SCHOOL CHAMPIONSHIP

Complete schedule of events of national importance for school prestige.

SPECIAL STUDENT EVENTS

Silver cups for students representing flying schools.

COMMERCIAL FLYERS' EVENTS

Trophies for superior performance that will attract flyers as did the Aeronautique of 1928.

OUTDOOR EXHIBITION OF NEW AIRCRAFT

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NATIONAL ASSOCIATION OF FLYING CLUBS

Organization of association and election of officers during the three days of the meet.

NATIONAL ASSOCIATION OF PRIVATE FLYERS

Organization and election of officers of such an association.

ON TO COLORADO SPRINGS RACE

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Pikes Peak Aeronautique, Inc.
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Send details of the PIKES PEAK AERONAUTIQUE. I (we) expect to participate in the meet.

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(*Continued from preceding page*)

zeros on it. Yes, that was the ship that caused more grief. Yet, it caused more happiness too than any other ship on the field. Easy to fly. Rigged, was it? Pleasure to fly it. Landed O. K. Back for formation and night flying. Not so bad. You have done the same things in the old PT's.

Cross-country trips. Where are you, anyway? Why did the clouds have to come in. You wish you had studied Navigation a little harder. Land to ask a farmer. Yes, you are all right. You were good on forced landings. Proceed to place designated. The instructor didn't ask you why you were late. So you said nothing.

Practice for review for graduation.

Graduation day. Pass in review. Not so bad. You stayed in place and made your last landing at the *Primary Flying School.* Same speeches, same congratulations. Turning in beds, trunks. Packing up. Last dinner, and on the way to Kelly Field for your last four months of training. As you pass down the road you notice new men in civilian clothes reporting in. Would they go through the same worry, grief and apprehension? How you pity them, yet envy them.

Kelly Field, or the Advanced Flying School. You have seen it every day or have heard it every day for the last eight months. But this time it is different. You are there. New barracks, new beds, new bells. No more worries. New life, new ships and new types.

Flying starts with transition. Who will ever forget the famous family of 02's? The "A," "B," "C" and the "H." You practice landings, formations and everything they had taught you at the Primary School. You had to be proficient on each ship, each type. They all flew alike but each had its own peculiar characteristics.

Days fly by and you fly with them.

Specialization. You don't know what you want, so you finally select—

Pursuit. You fly AT4's, and P-1's. Small and easy to handle—easy to barrel and dive. Such speed! You do every form of acrobatics, formation combat, balloon strafing. You even escort bombing ships on their mission to keep other planes from interfering with them. You are one of the fighters.

Attack. You fly A3's, a new ship with guns and bomb racks. You study geography with these ships. Altitude always zero. You rake the roads and trenches with your guns. You drop bombs on wagon trains and you hop hedges. You miss windmills, water tanks and chimneys. Night missions are just as easy as the others.

Observation. You fly 02's. Sweet ship! You become a lookout for the rest of the Army. Taught to see everything. Report accurately and forget nothing. Expert on radio. Buzzer now is useful. You call for the fire and report the hits and misses. You develop cat's eyes for night work. Dangerous, but very important.

Bombardment. You fly NB's and Keystones. You are the destructive gang. You drop big bombs that will destroy cities, forts or anything that they hit, and you make them hit what you want them to. Large and heavy, but you enjoy them.

Ground School—Something new for you. Not the old subjects, but new ones pertaining to your work. You are now receiving training for real military work and nothing else. It is interesting. If you stay in the Army, you will want and need it.

Time is flying by. Have to buy new uniform, boots, Sam Browne belt, gold bars—and you have no money.

(*Continued on next page*)

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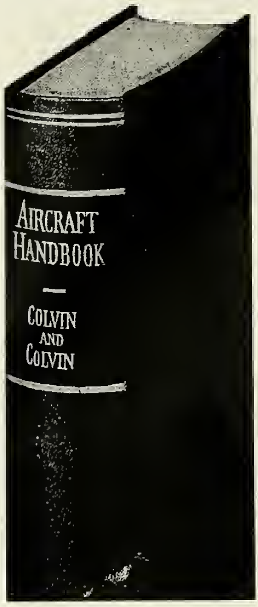

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A.D. 6-29

(Continued from preceding page)

Too many parties; too many dates—girls are to blame. How will you get them? Well, how did the rest do it? Telegrams — ? Yes. You get them.

Gunnery, bombing, cross-countries, night cross-countries—all over.

Big maneuver and then return, and then graduation. You state whether you desire active service or intend to go back to civilian life and carry on in the commercial game.

Packing up, turning in all clothes. No, you will not need the Blues any more. You are too happy now. Tomorrow! tomorrow!—and the end.

TOMORROW. Wake up at the same time, a little sad. Stand your last reveille. Eat your last breakfast. No one seems to want to talk. The BIG REVIEW and the LAST REVIEW for lots of you. Back to the barracks. New uniforms, boots and belts.

Speeches.

Congratulations.

WINGS! ! !

A few goodbyes, a few handshakes. Off to catch the train to carry some back to their homes—old friends—old loves. Others to their new stations to active duty.

Yes, there was lots of worry—grief—apprehension.

But—WINGS! ! ! !

AIRWAY BEACONS

(Continued from page 76)

about a mile of the beacon. Beyond that point no direct light reaches the pilot, but he is able to see the light scattered from the main beam by the dust particles in the air so that the beam appears to be rotating below him like a huge pointer pivoted at its tip.

When visibility is poor, however, even the most powerful beacons can not penetrate many miles, and if the beam does not have a wide vertical spread an airplane at a usual altitude is above the direct beam before it is within the visible range. The stray light under such conditions may not be visible more than a quarter of a mile, and even should the pilot pass so nearly over a beacon, he is likely to be above the visible spread of the stray light before he is close enough to see it. Since the scattered light under these conditions can not be seen more than a few hundred feet, it is of no use in hazy weather. If, however, a portion of the direct beam is sent upward at an angle of perhaps 15 degrees, it may be powerful enough to reach the airplane, notwithstanding the haze, for in this case the airplane does not pass above the beam until well within two miles of the beacon, and under most weather conditions the light of the main beam can be seen at that range. It is important to observe, however, that any increase in vertical spread requires an increase in the luminous flux unless there is to be a decrease in the candlepower in other parts of the beam.

A person who has never flown at night generally has no idea of the very large number of flashing lights which resemble flashes of beacons. Automobiles passing over the brows of hills or around curves, advertising signs so far away as to appear like flashing points of light, and street lights suddenly flashing out between obstructions are the most frequent sources of confusion. Having seen one flash of such a false light, a pilot must watch for a next one, and if it does not occur in ten seconds he may think he has overlooked it and watch for another ten seconds. During this time the pilot's attention is diverted from the search for the real beacon and the plane may be getting farther and farther from its source. This

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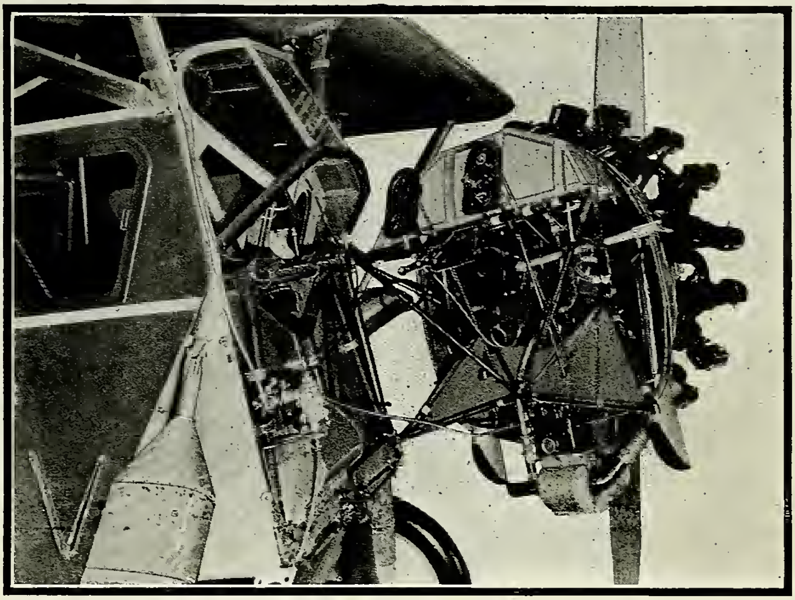
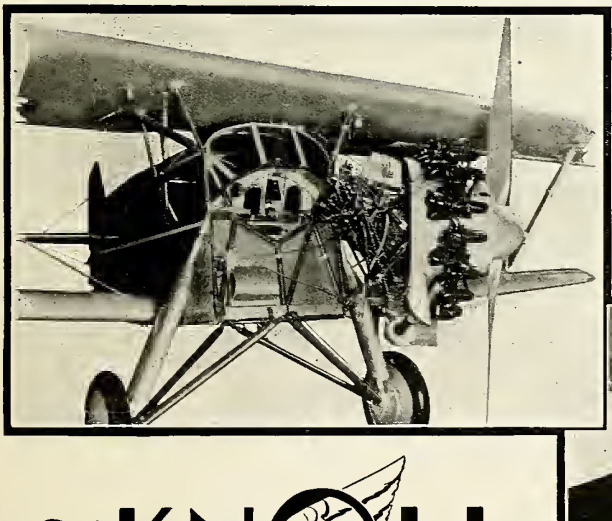
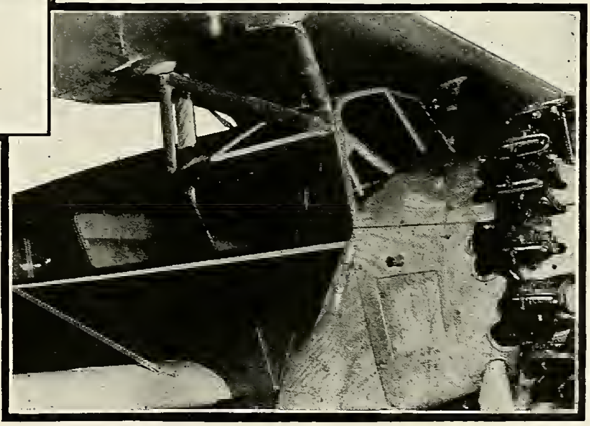


OPERATING ECONOMY

TYPICAL of the many features which make for economical operation with Knoll aircraft is the engine mounting of the KN-1. The entire power plant — engine control, instruments and every engine accessory — is demountable as a unit. Loosen the cowling, disconnect the gas line, remove two bolts and the power plant swings out — perfectly accessible on every side. A complete new power plant unit can be installed in less than 30 minutes. The only connection broken is the gas line. The advantage of instruments, lubrication lines, engine accessories, controls, etc., installed and adjusted to the engine in the shop is obvious to the experienced operator.





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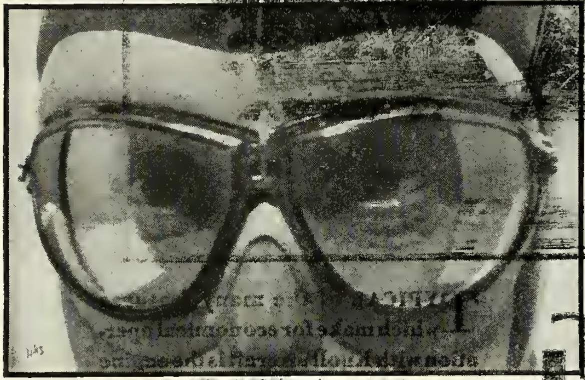

THE WILLSON PILOT GOGGLE

At the end of a prolonged flight, the Willson Pilot Goggle rests as comfortably on your face as when you started. Its sponge rubber vacuum mask is large in area, and light in pressure. It fits every contour of the face perfectly, and the venturi-tube ventilating system creates a partial vacuum to hold the goggle in place. The Willson Pilot Goggle can't blow off, even with wind pressure from the side. Nor can the lenses steam or fog, under flying conditions.

The lenses are meniscus-ground, to assure neutral vision through the entire field of normal eye rotation. Each lens permits horizontal vision of 135°. They are ground with the utmost optical precision, to give perfect unstrained vision, and greatest safety. They are made to U. S. Navy specifications.

The goggle frames are aluminum, enameled dull black like the inside of a camera. In every detail, the Willson Pilot Goggle is of advanced design, and precise durable construction. Yet it is priced no higher than many commercial goggles which do not meet Navy specifications . . . . $20.

There is also the Willson Observer, at $10, exceptionally satisfactory in the service for which it is designed. If your dealer cannot supply you with these goggles, write direct to us.

Airports and flying schools find Willson Goggles a popular and successful line. Write for detailed information.

Willson Products, Inc.
Aviation Division
239 Washington Street
READING, PENNSYLVANIA

(Continued from preceding page)

confusion of lights is particularly likely to be a serious one near cities and in thickly settled regions. It is overcome by using colored lights for airway beacons. A flashing colored light is uncommon, and if the pilot knows the light he seeks has a distinct color he is able to pass over nearly all false lights without hesitation.

It is desirable, however, that colored glass intended for use in beacons be carefully selected. A poor glass will either give too little color to the beam or absorb an unnecessarily large part of the luminous flux. Inasmuch as the Airways Division has adopted a definite code for beacons, it is desirable that colored beacons conform to this code and especially desirable to avoid intermediate colors which might be interpreted by the pilot as either of two colors.

Distinctive characteristics are very important in airway beacons in order that pilots may have no doubt of the identity of the beacon. If the pilot is sure of his position, he does not need a beacon. If he is lost, he not only wants to find some beacon, but he must know what beacon it is.

The Airways Division has brought out the course light as an answer to these difficulties. These lights flash code numbers, based on the airway mileage, which give each beacon a distinctive characteristic. The series of flashes required for the code number is long enough to enable a pilot to pick up the flashes readily. The time required for flashing the code number (5 seconds) shortens by so much the time between signals. Red course lights are used where no lighted landing field is available. Yellow lights mark intermediate landing fields, and are recommended for airports. The latest airway beacons are equipped with special lenses which direct some of the light upward as high as 25 degrees, and also a set of lenses on the roof of the beacon case which send out auxiliary fan-shaped beams at right angles to the main beams. These fans of light cover vertical angles from the horizon almost to the zenith and while they are much less powerful than the main beam they have a higher intensity than the stray light.

When the weather is good an experienced pilot does not need beacons. The lighted cities are most excellent landmarks. I have heard of a pilot flying over the transcontinental airway toward New York who was able to see the lights of Pittsburgh, Philadelphia and New York City all at the same time. It is important in selecting an airway beacon to remember that it is a bad weather guide post.

Publication Approved by the Director of the Bureau of Standards of the U. S. Department of Commerce.

AIR—HOT AND OTHERWISE

(*Continued from page 67*)

when it comes to getting home the bacon for his Naval co-conspirators. The Army lads are not such swankers as the Navy's high command, but poker-decks, perhaps, have given as good training as quarter-decks in certain matters, and it is not impossible that experience at Chateau Thierry will be valuable when it comes to fighting at the chateau on the top of Capitol Hill.

JUST for the purpose of helping us to think and cleaning up our minds, let's consider for a few minutes Congressman Frank James. It will be a pleasant disinfectant for our mental processes.

Having watched the Army promotions bill carefully, we

(*Continued on next page*)

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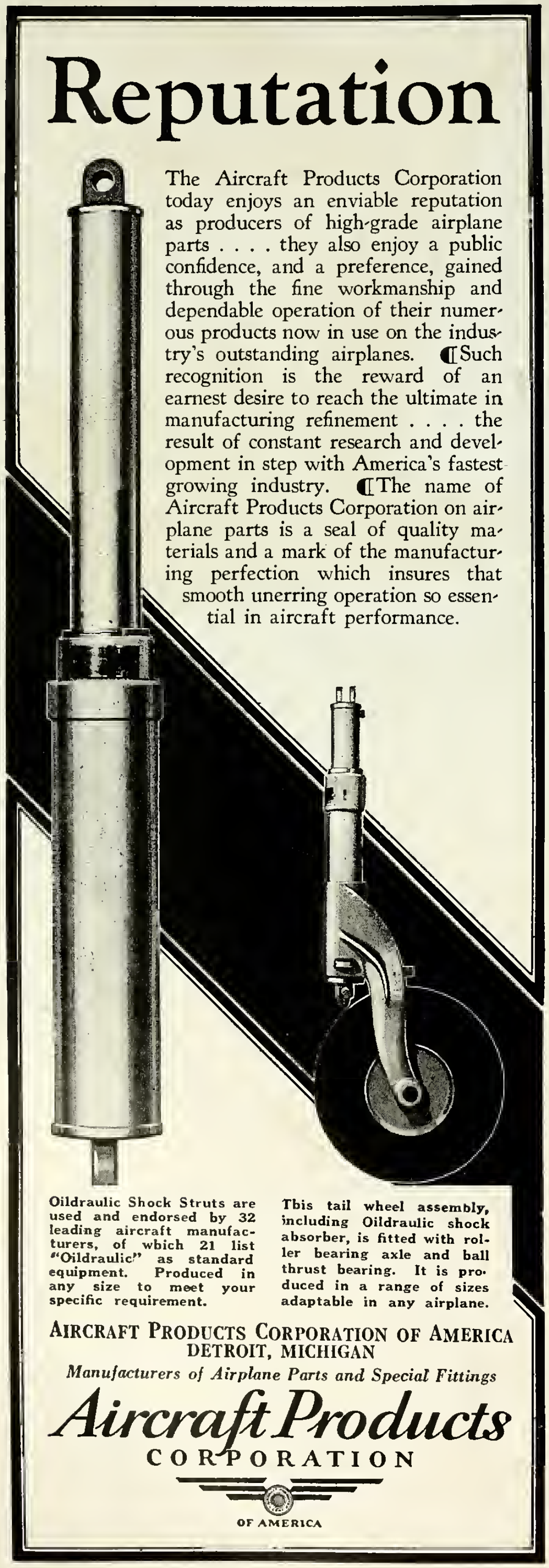

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(*Continued from preceding page*)

called upon this balanced member of the House of Representatives when some of the military journals said the measure introduced in the Senate was identical with the Conference measure on which agreement had been practically reached when the last session adjourned.

"That statement," said the Congressman, "is not correct. I am against any 'forced attrition,' or direct method of kicking competent officers out of the Army, and also am unalterably opposed to any indirect 'suggestion' to them that they voluntarily 'resign,' receiving for the sacrifice a silly cash compensation.

"Any promotion legislation which eliminates without his full consent from the rolls of the United States Army any competent officer is contrary to the best interests of our national defense and is unjust and reprehensible.

"I am for a separate promotion list for the Air Force and when I say 'separate' I mean separate. So, obviously, I am for the Maas bill, just as it is written, and against any substitute which may have been or may be prepared by men more interested in themselves than in the Air Corps.

"I am against any proposition that will further discriminate against those National Guard and other officers who came into the Army from civil life.

"We have been asked to take care of officers 'in the hump' and not those above it. I am opposed to any legislation which gives a crumb to the one and a loaf to the other.

"Out in the field I find the feeling that the Washington crowd are more interested in looking after themselves than they are in looking after the interests of the Army as a whole.

"To appreciate properly the legislation needed to improve the morale of the Army at large, one must spend much time actually doing duty with the troops really upon the job."

Some difference between the attitude of this patriotic member of the House and that of the statesman from Connecticut!

Our own belief is that no promotion bill will be passed by the House that does not give the Air Corps a separate list in the fullest sense. The House will tolerate no jockeying of words; no jokers, no bunk of whatever kind. Congressman Frank James has proved that he is for the Air Corps, and if the Air Corps men in Washington get back of him and insist upon receiving what they really deserve, they will find in him a Moses to lead them from the Wilderness—the kind of Moses who, though coming from the bullrushes, can't be dumped back into them. He swims and he flies.

He has been in the Army and he knows what the man in the field is up against. That makes him valuable even though he couldn't make a wooden nutmeg if he tried.

James's statement says the Maas bill is practically the same as the Furlow bill of last session. Furlow, who failed to get back into the House, and who was one of the conferees, now represents the Curtiss interests in connection with Chester Cuthell at Mr. Cuthell's Washington law office.

AGAIN the battleship. It is reported that the Naval estimate for the next fiscal year will include provisions for two more of these great obsolescenses as replacements for two destroyed under the terms of the Washington Conference. One result of the result of last year's cruiser program apparently will be another try at it. That means at least one more hundred millions of the

(*Continued on next page*)

PLANE MAKERS HARD HIT FOR SKILLED AID

BY J. C. BOYLE.

(Copyright, 1929, by The Star-Telegram.)

NEW YORK, Feb. 14.—There are today approximately 30 corporations making airplanes in the United States. There are not enough skilled men in the industry to fill the places open for aeronautical engineers, test pilots, commercial pilots, instructors, expert mechanics and aircraftsmen.

Scenes from the T-A-T Flying School showing students in the shops and wood working department; loading the Air Mail; and below, a student from West Texas mounting a ship.

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HOW would you like to equip yourself for one of these big-pay jobs and go forward with T-A-T graduates who have already made good? You can do it—perhaps easier than you think! But you must have the kind of training these men have had.

At T-A-T—The Private Flying School of one of the nation's largest air line operators—you will get the thorough instruction vital to your success. We consider every student a prospective member of one of our several related companies, and many of the best graduates are offered T-A-T positions upon graduation. Because T-A-T training keeps the future employer in mind, it is easier for T-A-T students to secure the preferred positions.

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The Four T-A-T companies and the St. Tammany Gulf Coast Airways, Inc. (a related company) operate daily air mail and passenger routes over four states, maintain shops in the largest cities of these states, and distribute four of the leading makes of airplanes, as well as airplane and engine parts.

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Answer:—Because Balsam-Wool has been proven the most effective material for the purpose. It is especially *light*. It is *flexible* and *fire-safe*, and it is *efficient*, both as a sound deadener and a heat insulator.

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(Continued from preceding page)

people's money to be absolutely thrown away. Wasted.

If this money must be spent, spend it on aircraft carriers. They are the ships which could actually help us in the future times of war. If the Navy, when that grim time comes, is to have any value whatsoever, it will be by reason of FAST 12,000-ton carriers. Naval maneuvers of last winter demonstrated the value of such ships in the brilliance of the *Saratoga's* bombing raids on the locks of the Panama Canal. I am glad to have the chance of quoting from a letter written by a participant in those raids.

"During the night of the 25th we steamed north, in company with the *Omaha,* at 25 knots, our main purpose being to get the planes off for the attack on the Canal before making contact with the enemy.

"It was a night of mysterious distant flashes and rumors, with everybody called to quarters at 3 a.m. From then on, with the 84 planes all spotted on the flight deck, we were on hair trigger, fearing the enemy might discover us. At about 5 the planes started taking off in the pitch dark. It was weird to see them shooting off into the night, their running lights immediately mingling with the stars.

"Eighteen big bombers were in our squadron. We had flotation gear, life preservers, parachutes, food and water, hatchets, rope and first aid kits, etc. My seat gave me a fine view of everything. We ran down the deck at full throttle and soon were in the air. Blue exhaust flames and running lights appeared and we took our place in the formation, the leader blinking a signal to us with his running lights.

"Our advance guard had reached the Canal, taken the defense by surprise, successfully attacked and were returning. They were Boeing F3Bs, high speed fighters, carrying small bombs, but able to dive with them at great height and tremendous speed, thus taking the enemy completely by surprise.

"We constituted a very formidable weapon: 18 heavy bombers surrounded by fast fighters for protection, launched from a carrier 125 miles at sea, which the enemy had been unable to locate in time, though they had had definite information from their scouts.

"Soon we sailed serenely over the locks, dropping cans of lampblack on them to represent bombs. We were at ten thousand feet and either they had gone to seek us in the wrong direction or couldn't get up to us from the ground.

"Of course there were the anti-aircraft guns, but they couldn't stop us and it wouldn't take many of the big bombs to put the locks out of commission."

Something for the American taxpayers to think seriously about in the letters from this boy.

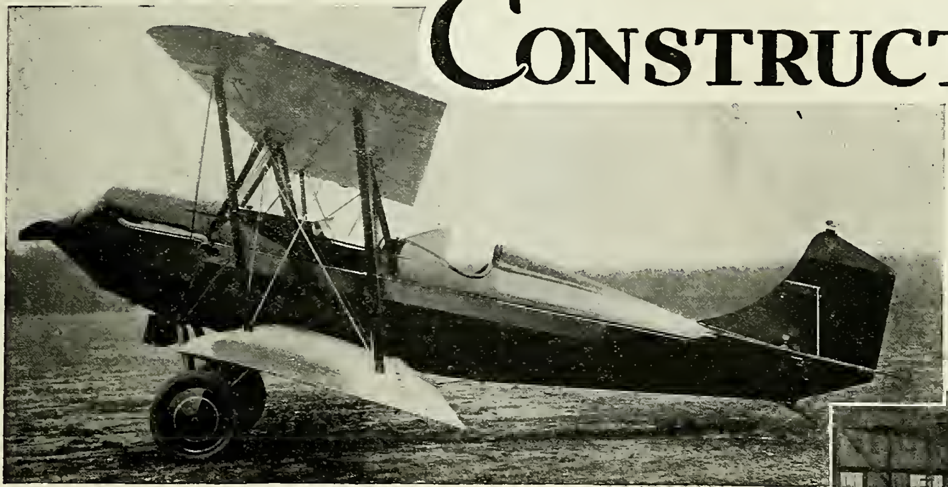
A NEWSPAPER release issued by the Aeronautical Chamber of Commerce announces the removal of the Chamber's executive offices from 300 Madison Avenue, New York, to 10 East 40th Street. In it lies the announcement of the separation of the Chamber from the Manufacturers' Aircraft Association, which has shared its quarters since 1921 and therein lies an interesting tale.

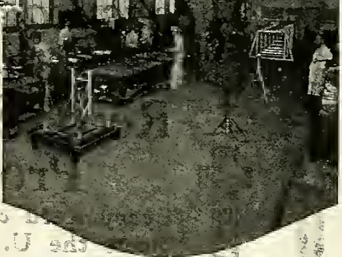
When Fred Rentschler was elected president, we felt sure the Chamber would be as if Voronoff himself had re-glanded a degenerated body. We said so. And now we know that it may mean the resignation from the Chamber of Mr. Samuel Bradley, who was acting as joint general manager. No man can serve two masters.

The purposes of the Aircraft Manufacturers' Associa-

(Continued on next page)

Precision CONSTRUCTION



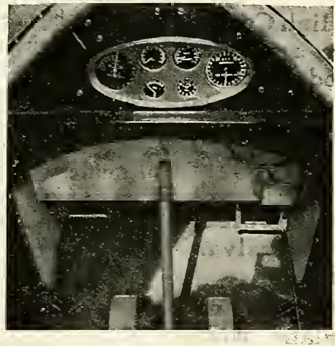


THE Air Boss has been constructed to meet the great need for a medium priced, precision built, three place aircraft, with a low landing speed, quick take off, economical operation cost, good payload capacity, and easy maneuverability.

In its newness it receives as a heritage the eighteen years of flying and designing experience of its designer . . . Glenn E. Messer. Glenn Messer does not need any further introduction to the airwise American public.

Every essential part of this ship, from complete fuselage to tail skid, is jig built to insure interchangeability and absolute precision in construction. Its control system and appointments are the most complete ever offered in any similar type ship. Its performance is sensitive and responsive . . . stable but maneuverable . . . and it is constructed so that it gives a pilot the assurance he *must have:* that his craft will do the job at hand under any circumstances.

The Southern Aircraft Corporation has gone quietly about the business of perfecting this ship without experimenting at the cost of the public, and the Air Boss with all its superior qualities and appointments costs no more than an *average* ship of its type.



THE COCKPIT

Dealer and prospective owner inquiries are solicited.

SPECIFICATIONS

Wing Area	298 sq. ft.
Span over all....upper wing	32′ 4½″
Span over all....lower wing	30′ 9″
Chord ....upper wing	60″
Chord ....lower wing	60″
Wing loading	7½ lbs. per sq ft.
Length over all	23′ 3″
Height	9′ 5½″
Weight ....empty	1350 lbs.
Weight ......fully loaded	2200 lbs.
Useful load	850 lbs.
Cruising speed	90 mph
Maximum speed	above 110 mph
Cruising (endurance)	8 hours
Landing speed	30 mph
Take off	100 feet
Ceiling	17,000 feet
Rate of climb	1,000 feet first minute
Wheel tread	72″

EQUIPMENT

- Spring steel tail skid
- 30 x 5 tires
- Indirect lighting of instrument panel
- Right and left hand throttle
- Dual control
- Radiator shutters
- Chrome molybdenum construction throughout
- Split type landing gear
- Quick detachable motor mount
- Quick detachable cowling
- Baggage Compartment
- Streamline head rest
- Adjustable horizontal stabilizer in flight
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(*Continued from preceding page*)

tion are so diametrically opposed to those of the Aeronautical Chamber of Commerce that conflict was unavoidable. Rumblings of dissatisfaction have been commoner, therefore, in the Chamber than rumblings of summer thunderstorms outside of it, and since Mr. Bradley received no salary from the Chamber, it is possible that this was because of the general impression that his services in some manner were compensated by the work which occupation of the dual job enables him to do in the Chamber for the Association. Now we shall have a Chamber which will make all information with regard to the whole industry available as collected to every member. Thus the Chamber should grow rapidly, making itself an important factor in the right development of the nation's commercial air interests. A story might be told about the Manufacturers' Aircraft Association, and in a short time we expect to tell it for the common good. It may prove interesting to a number of the members of the Chamber.

AIR COLLEGE FOR TRANSPORT PILOTS

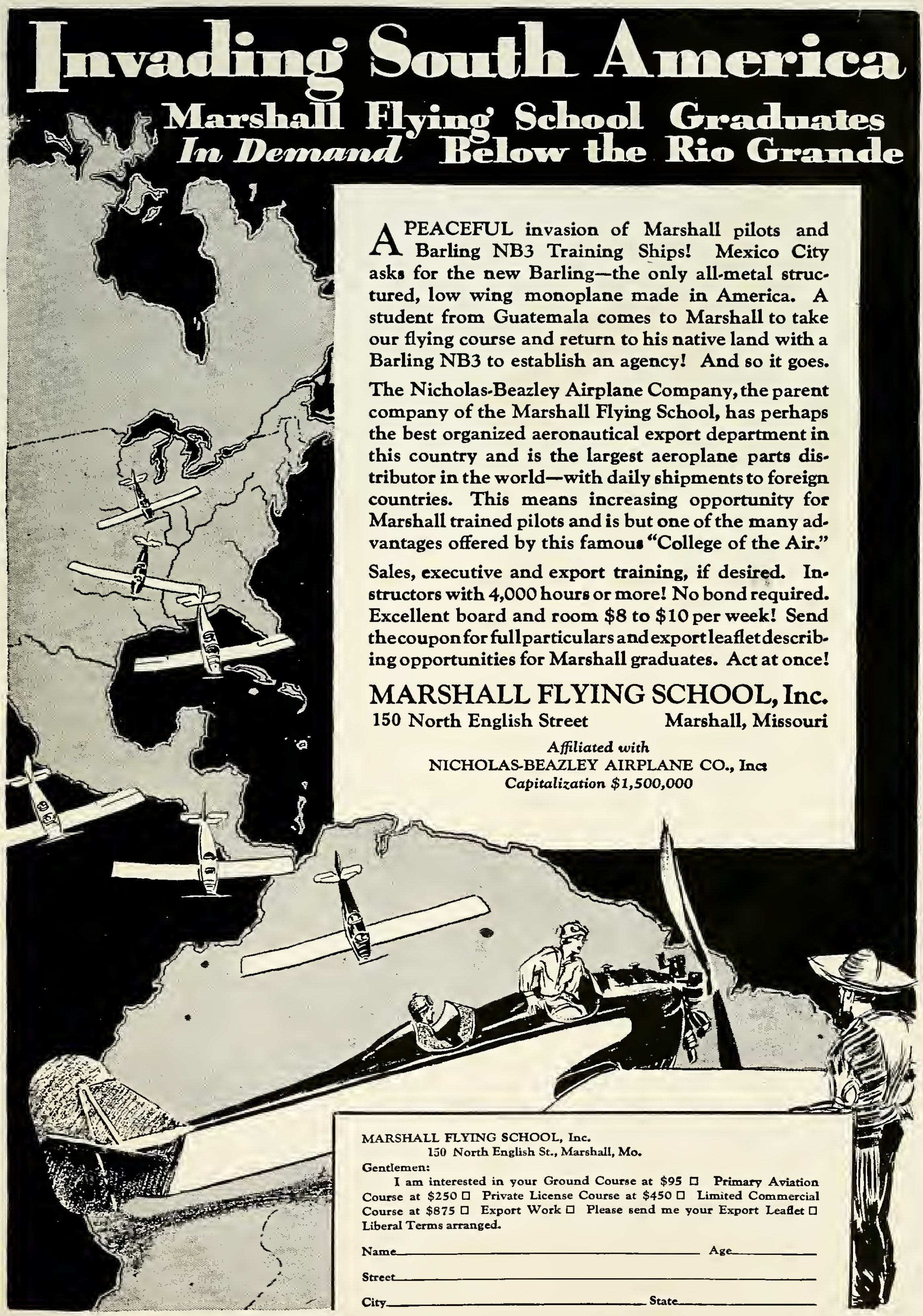
(*Continued from page 72*)

turn out really good pilots and give them that continuity of air and ground instruction which should be an indispensable feature of their training.

All training should accord with the spirit of the flying school regulations recently announced by the Department of Commerce. Due regard must be paid to ground training, and instruction along this line should be carried out during the whole period of the course. It is not suggested that every transport pilot should be a fully qualified aeronautical engineer, but it is strongly emphasized that all should be familiar with every part of the planes they will fly, including the engines and the instruments. Elementary instruction should, of course, concern itself with the theory of flight. It is highly desirable that each student understand what makes an airplane fly and what the effect of the controls are in flight, so that he will understand later on what he is doing. Learning to fly by rote is as dangerous as it is nonsensical. Elementary meteorology is another important subject. The student should be, and in some schools is, taught the different cloud formations and the conditions in which rain or fog may be expected. He should know how a plane is built and how it is rigged, for the information he gains will teach him to understand and respect his machine and not put it to too great strains in flying. A complete and detailed knowledge of several types of engines will help him to diagnose motor troubles and may be of direct advantage to him in the event of a forced landing away from an airport. From there he must advance to a knowledge of his instruments, and he should know how each of them works, for only in this way will he come to place his whole trust in them and depend upon them in those trying moments, which every flier sooner or later meets, when his instinct runs sharply contrary to his instruments, such as when flying through clouds or fog. An understanding of radio and ground organization, flying rules and state air laws should also form part of his ground work.

Some European air transport companies, notably the K.L.M. of Holland and the Luft Hansa of Germany, start actual flying instruction on gliders. There is no question but that a student can learn "the feel of the air" more rapidly on gliders than on powered airplanes. To feel at home in the air is, after all, a requisite of training, and all the instruction in the world that does not accomplish this re-

(*Continued on next page*)



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(*Continued from preceding page*)

sult is wasted. The glider teaches a student pilot not only how to fly but also how to utilize the air currents. When he starts his plane instruction after his preliminary glider flights he knows how to fly, but that is not the most important thing he learns. The knowledge he gains, combined with an adequate knowledge of meteorology would teach him a great deal about the air currents swirling upward, downward and around various natural objects and would thus enable him either to avoid them or to take advantage of them. But the chief advantage of starting a student out on a glider lies in getting him used to the air, and this is a very great advantage, as anybody who has trained pupils will agree.

The theory of teaching a student to fly is not merely to show him how, by certain movements of the controls, he can take off, guide a plane in flight and make a safe landing. There is a good deal more than that in it, and it is to be feared that many instructors themselves are not familiar with the theory of teaching practical flight. The principles governing instruction in flying were worked out on a scientific basis some fifteen years ago and were put to the test in England during the latter part of the war. Several improvements and refinements have since been made, owing partly to the perfection of various instruments and the invention of new methods. But it is safe to say that scientific instruction is now being given to all student pilots in the major countries of Europe. Simply stated, the theory underlying scientific instruction is that a pilot should not only be taught to fly but how to fly. The student ought to start off by being taught how to keep a plane straight and level. He should then graduate to turns. He should not be taught that by pushing the rudder bar to the right and pushing the control stick to the right, etc., that the plane will turn to the right. He ought properly to be taught that the rudder turns the machine, that the stick banks it to prevent it from slipping out of the turn; he must be shown the result of putting too much rudder and not enough stick on, or too much stick and not enough rudder, and how to correct the error; he should have explained to him, over the telephone in the plane, that as the plane is banked over the rudder tends to become more and more the elevator and the elevator more and more the rudder. For this reason, he should be told that when a turn is made the normal tendency will be for a machine to drop its nose because the rudder is acting (in the case of a forty-five degree turn) partly as elevator and is therefore sending the nose downward. To correct this he must pull his stick back to speed up the turn and to pull the nose up, for the elevator is also acting partly as rudder. And he must be shown the consequences of failing to make these movements.

Elementary instruction in flying airplanes should concern itself with teaching the pupil the ordinary evolutions, graduating him from ordinary flying and landings to a thorough grounding in so-called stunt flying, by which is meant stalls, loops, spins and rolls at high altitudes, and forced landings. All this should take place before the pupil goes solo. The advantages of this method will be obvious when it is explained that this proposed course is so planned that the student is made, unconsciously, to put the plane into difficult positions and left to himself to get it back in a level flying position. For example the machine will be steered above some difficult country in which landing fields are scarce. He will then be told to loop. When the young flier is on the upward curve the instructor will suddenly switch the engine off prematurely. The result is that the

(*Continued on next page*)

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The Napier aero engine has
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H. O. D. Segrave when he drove his Irving-Napier car over one mile at the amazing speed of **231.36 m.p.h.** He used a Napier engine.

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(*Continued from preceding page*)

plane will most probably hang in the air and either fall through the loop or stall out of it. In either case the plane may go down into a spin. The instructor sits tight and says nothing, leaving it to the student to get the plane out of the difficulty and make a forced landing as best he can. Only in case of absolute necessity will he tell the pupil what to do and under no circumstances, short of grave danger, will he take the controls out of his hands. This sort of thing ought to be varied throughout the course so that when the student goes on his first nominal solo flight (he is in reality going up without his instructor), actually he has "gone solo" scores of times before, for the instructor has let him fly and land the plane alone many times. There is probably no surer

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secret landing fields, each of them extremely difficult to land upon. The chief instructor, with whom the pilot has never been up before, should tell him to do a specified number of evolutions, asking him questions about each movement, and at a given time he should point out one of the secret landing fields and say simply "land there." Upon the pilot's ability to do so would depend his rating in the examinations. He should also be made to execute a number of spot landings—landing upon a designated area and stopping over a designated spot, none of which he has ever landed on before. It is easy to see, I hope, that a pilot so trained will be ready for any emergency that may take place in the air and, having had a good ground education, he should understand the nature of each emergency and be readily able to meet it. Even if the student is not adjudged suitable to continue his flying for a transport license, it stands to reason that he is likely to be a better private pilot than the average flyer now turned out by the majority of our air schools.

Assume that the student has now put in some fifty hours of flying. He has to fly for another one hundred and fifty before he can obtain his transport license from the Department of Commerce. His ground studies will now be concerned with map reading and radio work and with the various instruments used for aerial navigation. In the air he will start off by flying short cross-country flights. These will be lengthened and eventually he will be required to make one or more landings away from his home airport. Night landings will follow and, eventually, night cross-country flights. But long before this he will be practicing blind flying in the daytime, with nothing to guide him but his instruments. He should be required to put in a gruelling twenty-five hours on this work, or longer if necessary, before he goes on his first long distance, cross country flight at night, and at least ten hours of his flying instruction toward the end of his transport course should be done in bad weather. In addition to his theoretical work on the ground, he ought

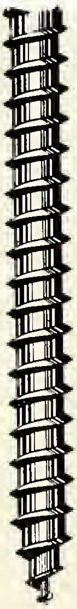
(*Continued on next page*)

pliment when

man, but it is a real recommendation when it is applied to screws.

That American Screws are "hard headed" is proved by the fact that their slots do not buckle under heavy handling or *automatic driving*. Their gimlet points and true running threads make them easy to insert.

American Screws of all types can be supplied immediately from stocks maintained in Chicago and Providence.



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Students learn to fly quicker in this new Lincoln PT. Its safety and bird-like stability give them utmost confidence.

The Lincoln Page Trainer is low in price, and low in upkeep. Performs excellently with any motor from 80 to 110 H.P. Permits the use of old OX5 engines that have hundreds of flying hours left.

Natty in appearance, the Lincoln PT is also a popular sport plane. Whether for sport or training this beautiful plane is the safest, sturdiest, most practical aircraft on the market. Write for free literature today!

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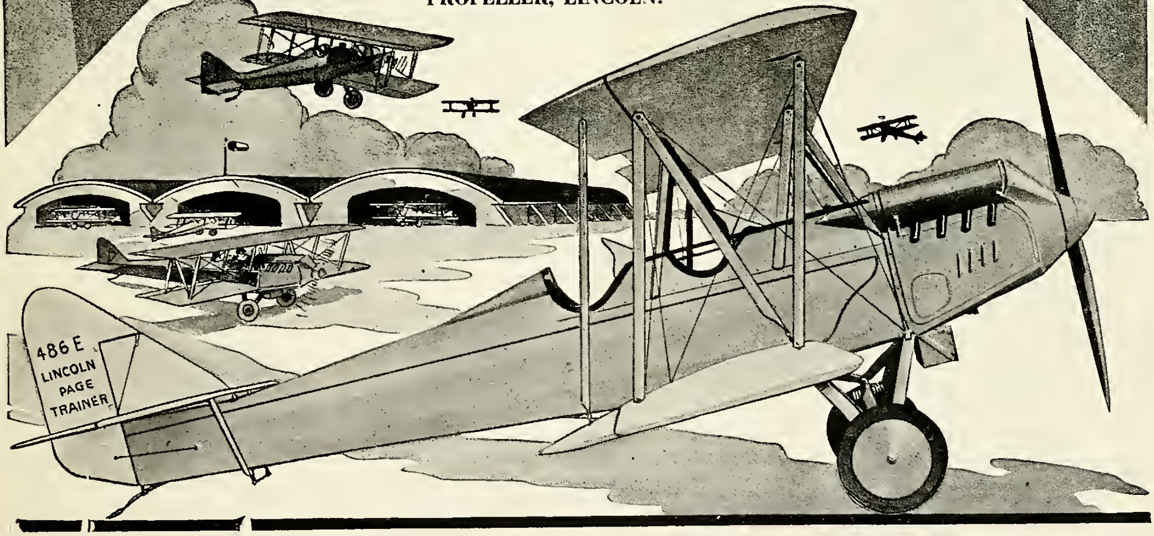

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(*Continued from preceding page*)

to be acting part of the time as a rigger, helping to make repairs to planes and finding out how to tune them up. Some of the time, too, he must act as an engine mechanic, aiding in the overhauling of engines and in dismounting them from and mounting them in the planes. At the end of his course, he should be not only a good pilot but an experienced rigger and mechanic, for he will have had all-round practical experience in the art of navigating and caring for an airplane.

After such training, the student pilot would now have qualified himself for a transport pilot's license but would still have two hundred and fifty to three hundred hours to put in before a transport company would be willing to risk the mails with him, and perhaps a further five hundred hours to go before the company would be willing to intrust passengers to his care over long distances. But he would be distinctly useful to a commercial firm, and companies would probably be able to find work for him to do in ferrying, flying passengers around the airport, and generally assisting in airport work. After a time a place ought to be found for him as second pilot in a long-distance transport plane and he should be allowed to fly the plane often under the supervision of the senior pilot, the two men alternating in the role of navigation officer. The next step would be to employ the young pilot on short courses and finally, depending on his ability, to appoint him as senior pilot on one of the main air mail airways, or perhaps as a flying instructor.

This must seem a lot for one man to accomplish in a single course, but if the instruction were to be detailed it would be found out that he would have a great deal more to do. However, not every day is suitable for giving a pilot flying instruction. On wet, windy or foggy days there will be plenty of work for him to do on the ground. Even in good weather, care ought to be taken that the student does not do too much flying, for it is easy to make a man stale by overworking him. So the courses, fair weather or foul, should alternate in the air and on the ground.

It is suggested that after a student has put in his five hundred or so hours he should be returned to his Air College for his final examination and that upon passing this he should be awarded an Air Commerce Brevet similar to the brevet worn by army and navy pilots. This examination, however, should be exceptionally rigid in its requirements and include schedule flying regardless of weather (within reason), parachute jumping, forced landings at night, etc., and in general flight under conditions that may be expected to prevail on the airways of the nation. In fact, much of the test flying should be done, at this time, over these airways. On the ground side, he should have to prove that he has mastered airport organization, first aid, and that he is able to care for passengers properly in the event of a forced landing, such as knowing how to telephone for a relief plane to continue the flight or even to radio for help by erecting a temporary radio mast and using the plane's radio set.

Such a course could not be completed in less than two years and it is not likely that a student would be able to earn anything before a year, if then. It is suggested that the transport companies themselves undertake part of th cost of training of transport pilots. A part might be don by endowments in the form of scholarships. In some case it would of course be possible for pupils to pay their wa through the Air College, though there would be littl opportunity for the poorer students to work their wa

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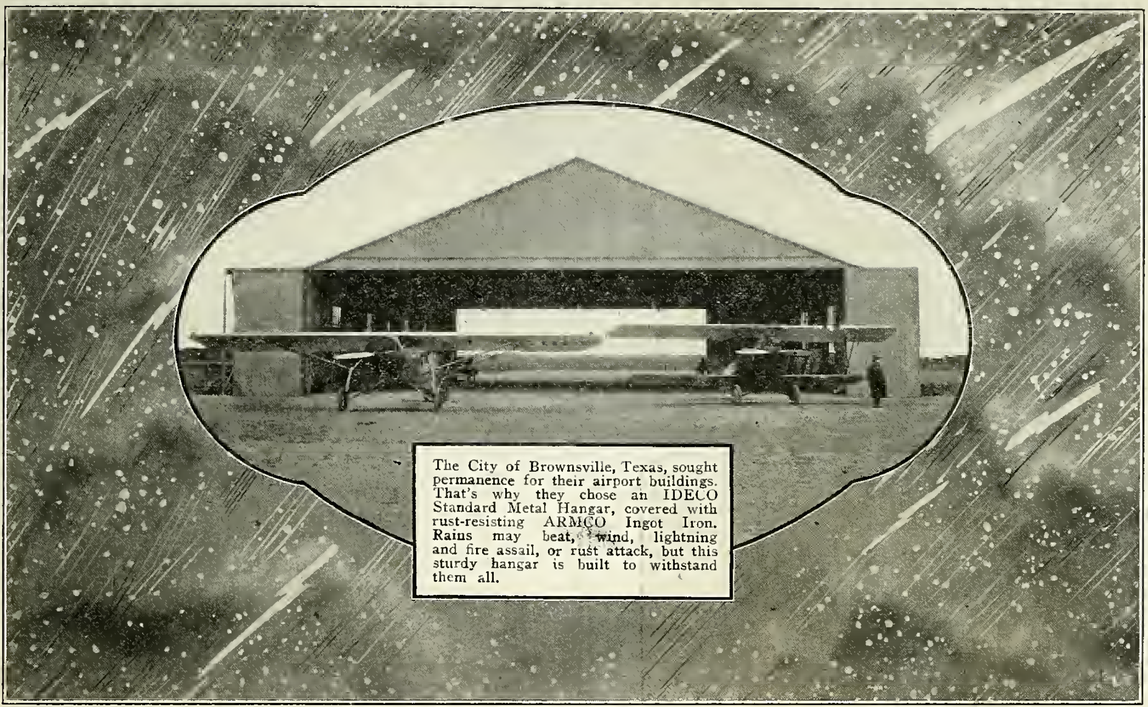

The City of Brownsville, Texas, sought permanence for their airport buildings. That's why they chose an IDECO Standard Metal Hangar, covered with rust-resisting ARMCO Ingot Iron. Rains may beat, wind, lightning and fire assail, or rust attack, but this sturdy hangar is built to withstand them all.

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An ARMCO Development Engineer in the office nearest you will be glad to counsel with you concerning your roofing, siding, and drainage requirements. You'll find his suggestions helpful. Just write, wire, or phone.

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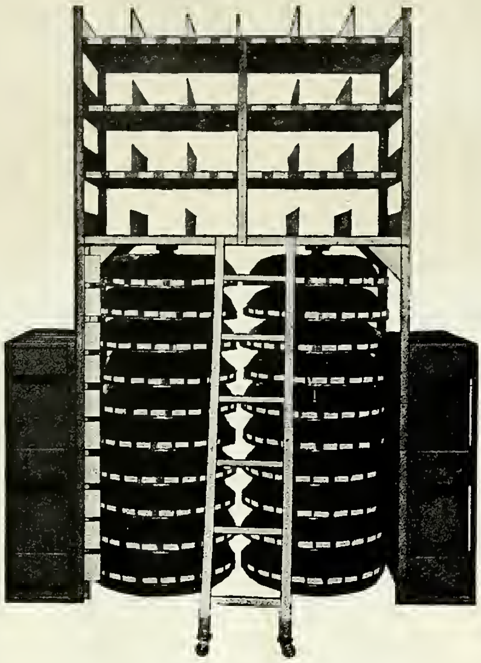

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(*Continued from preceding page*)

through. The most normal course to follow might be to assess each transport company a set sum for each fully trained transport pilot allotted to and accepted by them. And in return for initial capital advanced, any profits made by the Air College would flow back to the transport companies owning shares in the institution. It is an expensive project, but it is none the less vitally needed.

PNEUMATIC TUBES TO EXPEDITE AIR MAIL

(*Continued from page 66*)

ment to visitors. In Paris the *pneumatique*, shooting its special delivery posts at high speed underground, is known to everyone. The system employed is polygonal like that of Berlin and Vienna, in which stations are grouped on circular or looped lines around which their carriers travel in one direction only. In London the radial system is used, in which all the tubes connect the main postoffice with the sub-stations. A development of this principle obtains in New York. The pneumatic tube system was established in Berlin in 1865, in Paris in 1866, in Vienna in 1875, and in London in 1853. Thus these cities are already equipped to tie up their air mail service with the tubular port.

Little is generally known of this method of despatching mail between the main postoffices and their sub-stations. The metal containers or "carriers" which, in the New York system, hold the mail, and are shot through the tubes, are each 24 inches long and seven inches in inside diameter. They are embraced, exteriorly, by "riding rings" whose outside diameter is eight inches, and which prevent direct contact of the whole length of the carrier with the inside of the tube which is eight and one-eighth inches in diameter inside measurement. Each of the metal carriers weighs about 20 pounds unloaded or 30 pounds loaded, and carries 500 to 600 letters when loaded.

The carriers are shot through the tubes at a maximum speed of approximately 30 miles an hour, being impelled by a column of air supplied by relay stations of electrically driven fans or "blowers" in the basement of each postoffice. The air exerts a pressure of about five pounds on the rear end of the carrier. The column of moving air which drives the carriers makes a complete circuit constantly moving through the southbound and northbound tubes which are, in reality, one continuous tube. Thus the air pressure, being valuable, is most carefully preserved. Little of it escapes when a carrier filled with mail is shot on a table in the postoffice station of its destination. The carrier, on leaving the main tube to ascend into the postoffice opens a valve which closes after it. Its momentum carries it on to a final valve which opens under the compression of air created by the moving of the carrier. The air thus compressed serves as a cushion to reduce the speed of the carrier which, after it has passed the valve, strikes a buffer on a metal table, and is picked up, unlocked, and emptied of its mail. Newly filled carriers, or carriers already filled which have arrived at one station to be relayed to another, are placed in a metal groove which connects with the table. The departure of the loaded carrier is regulated by an electrical timing device, it being possible to dispatch a carrier every six seconds, though eight to ten seconds is the more frequent interval.

The methods employed in the European cities do not greatly differ from those in New York, though the sizes and tubes and containers vary (some of the tubes used in Berlin are only 3 inches in diameter), and therefore a description of the operation of one will suffice for all. The

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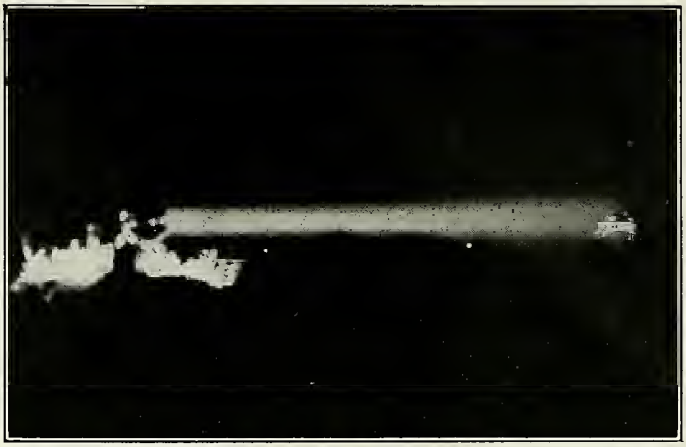
300,000 BEAM C.P. PORTALITE HAS MANY USES . . . . . .



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In the plane and around the airport

THE BEAM PORTALITE is an extremely compact, self-contained, portable electric searchlight, light enough to be easily carried in one hand, yet capable of projecting its 300,000 candlepower beam a distance of over ONE MILE!

The BEAM PORTALITE is invaluable when attempting to land or take off on an unlighted field, or in case of a forced landing at night.

All up-to-date and efficiently lighted airports should have a number of beam and flood PORTALITES on hand for emergencies. *When the lighting system fails* they can be placed on the ground, or held in the hand, to light a 2,000-foot pathway for planes landing or taking off. In case of a "crack-up" outside the lighted area the beam PORTALITE'S tremendous range will quickly locate it when minutes lost may mean lives lost; the flood PORTALITE will then illuminate the whole plane, help in giving first aid, and assist those working around the plane.

The beam PORTALITE should be carried on all planes travelling at night, for it operates independently of the plane's electrical system. Because of its "One-Mile Range" it is of great value to distinguish landmarks along the route, and especially in case of a forced landing. First, to locate suitable landing terrain; second, to examine damage—make adjustments and repairs; third, to illuminate terrain preparatory to take-off; fourth, in case of trouble, to signal for help by waving beam in air.

On tests, the *beam has been several miles* and the *direct rays* have been seen on Mt. Washington, at a distance of *97 miles*. This makes it especially easy for planes sent out on search to locate aviators equipped with the beam-type. It may also be equipped with telegraph key for sending messages at night.

Either type PORTALITE will run 2½ to 3½ hours on the regular supplied bulb or twice as long on a smaller bulb. When discharged, the battery may be instantly replaced with a re-charged interchangeable battery, because of its patented construction.

The beam PORTALITE is also used as an inexpensive and efficient ceiling projector.

Exclusive and Patented Features

1—*Projects 300,000 Beam candlepower over ONE MILE, because of its extra large and accurately shaped reflector, in combination with a highly concentrated filament operating on its compact but high-capacity storage battery.*

2—*Less weight in proportion to its power, than other makes.*

3—*Specially constructed battery, with metal insert in end, permits discharged battery to be instantly replaced with charged battery.*

4—*Construction of battery also eliminates use of outside metal casing and does away with metal corrosion from acid.*

5—*Battery, in addition to being non-spillable, has 27 plates—or six more than any other make.*

6—*Bulb can be focused from outside without usual necessity of removing rim and lens.*

7—*No metal casing for wires to run through and short-circuit.*

8—*Cells can be tested with hydrometer, as battery is not covered over.*

9—*All bracket parts made of composition bronze, carefully machined, and chromium plated.*

10—*Hard-rubber handle serves 4 purposes: as a switch; to carry light; to focus bulb; to set reflector pointing in any direction.*

11—*Non-breakable hard-rubber battery case, with instructions cast on sides.*

We will ship on 10 days' approval.

THE PORTALITE CO.
1109 Massachusetts Ave.
Cambridge, Mass.

Price
$45.00
Complete

Aviation's greatest auxiliary light

"12 YEARS OF FAITHFUL SAFETY SERVICE"

Please send our company BEAM ☐ FLOOD ☐ PORTALITE for tryout. At end of 10 days we will either send confirming order or return lite.

Company ....

Address ....

State ....

Official Title ....

Send literature..........☐

A

No. 16-16 Parts Cabinet

Shop Cabinets That Save Time, Labor and Space!

EVERY aircraft shop and factory will find a need for these ANGLE STEEL Cabinets. Orderly, systematic storage, built to speed up work-in-production and fire-resistant features are a few reasons why you should specify this all-steel equipment.

No. 16-16 Cabinet (above). For small parts, screws, bolts, nuts, etc., of all sizes. 16 drawers are arranged in two tiers. 12 top drawers all have 28 compartments. Four bottom drawers are subdivided into four compartments each. Over-all size, 35½" wide x 12" deep x 28¾" high. Olive green lacquer finish throughout.

No. 36-24 Tool Cabinet below. An unusually useful place for storage of tools where they can be locked up for safe keeping. Tray top serves as work table. Firmly made of sheet steel. (Size, 36" high x 24" wide x 16" deep.) Has two loose shelves which are adjustable. Locking knob handle; keys furnished. Olive green lacquer finish.

No. 3875 Sundry Cabinet (See description under illustration below).

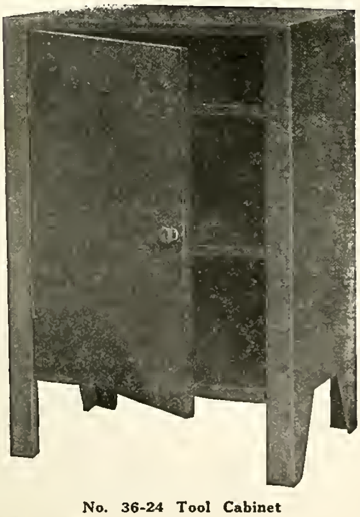
Send for Catalog "C", listing over 250 pieces— SPECIAL WORK also available.

ANGLE STEEL STOOL COMPANY

Agents and Dealers in Principal Cities

PLAINWELL MICHIGAN

NEW YORK—Angle Steel Stool Sales Co., 98 Park Place
CHICAGO — Lothrop Angle Steel Equipment Co., 325 W. Madison
DETROIT—All Steel Products Co., 333 State



No. 36-24 Tool Cabinet

No. 3875 Sundry Cabinet. Has 54 drawers of varying sizes. Size 25½" wide x 11¼" deep x 43½" high. Just the thing for small parts

(*Continued from preceding page*)

important point is that the service is uninterrupted by heavy snowfalls in the streets, by traffic jams, or by armed bandits in motor cars. In New York the operation has reached a remarkably high stage of efficiency. The percentage of perfect operation, or service, for several years back has been as follows: (*1922*) 98.8033, (*1923*) 99.9101, (*1924*) 99.0141, (*1925*) 99.9725, (*1926*) 99.9597, (*1927*) 99.9726, (*1928*) 99.9661. Interpreting the last figures, one may say that in 1928, the pneumatic tube mail service in New York was within one twenty-fifth of one per cent of perfect operation.

The saving of time in the arrival of mail at its destined postoffice to reach earlier mail carriers who are starting on their routes through the buildings and for out-going mail to reach departing trains is one of the outstanding advantages of the system. It requires but four minutes for mail to pass between New York and the main Brooklyn postoffice, while mail dropped in uptown postoffices in the morning is delivered in Park Row or Wall Street at two or three o'clock on the same day. In some cases the use of the tube through connection with varied train schedules to distant parts of the country may mean a gain of 24 hours in the arrival of a letter at its destination.

THE HANCOCK FOUNDATION COLLEGE

(*Continued from page 47*)

The airport is an 80-acre tract which is used as the base of operations of the Santa Maria Air Lines, Inc., a company controlled by Mr. Hancock. Buildings on the field which are available for use by the college include an administration building, dormitory and class rooms, restaurant, a fully equipped engine building, a fully equipped airplane building, a machine and overhaul shop, and five hangars. Ten airplanes used by the college comprise a wide variety of types; e.g., Wacos, Curtiss-Robin, PT 4 Husky Jr., Stearmans, Lockheed Vega, Buhl Airsedan, Avro Avian with slotted wings, and Bach trimotor.

A field fueling station, radio station, weather department, weather ticker service, aerial cameras, etc., are included among the equipment at the airport. Nearby there is a recreation field. Nine different makes of modern aircraft engines are used in student instruction.

Although students are not required to live in the dormitory, they may do so at a very nominal charge. Students who choose to live in the dormitory are assigned two to a room (separate beds) and are furnished with bedding, sheets, towels, etc. At the college restaurant students can obtain simple but wholesome food at a price considerably below what they would pay elsewhere.

Instruction is carried on five days during the week, each day being divided into four periods of one hour and fifteen minutes each. On each Saturday there is a semi-military inspection and a review of lessons. Each day's routine (except Sunday) begins with reveille at 6:00 a. m. On Mondays, Tuesdays, Thursdays and Fridays the order of procedure includes calisthenics at 6:15 a. m., breakfast at 7:00, inspection at 7:35, classes from 7:45 to 11:30, dinner at 12:05 p. m., classes from 1 p. m. till 4:15, drill and athletics at 4:30, retreat at 5:30, supper at 5:45, inspection at 6:30, and taps at 10:00. A somewhat similar routine is followed until noon on Wednesdays though the afternoon is devoted to organized recreation. Saturday is inspection day, with the afternoon and evening free. Leave is granted all day Sunday.

Since the college is thus conducted in a semi-military

(*Continued on next page*)

ROY F. MORRIS, President and Manager

Learn To Fly The Morris Way It's The Safest, Latest and Quickest

Hundreds of Students Know It—That Is The Reason We Have The Fastest Growing School And One Of The Largest In The Middle West.

Compare my school with any other—my prices—my new training planes—factory equipment—ground school—night classes—machinery and extra large training field.

Changing types in planes, new technique, ultra modern instruments and new equipment make it imperative that you get your first training where only the newest methods are taught and the newest ships and equipment are provided.

Here you learn to fly New Travel Airs, New Swallows, New Lincoln Pages, Eaglerocks, American Eagles and Ryan Monoplanes. All ships are licensed and students are taught by only licensed transport pilots.

Our engineers and instructors have had years of experience building airplanes and know the right way to teach you properly. We use all the latest safety devices, including the Safety Snatch Release Control and the Telephone System on our training planes. These are a few of the reasons why we have a high rating all over the country as an up-to-date progressive school.

I've had over 10 years of flying myself, but I take off my hat to the men I've assembled to take charge of your training—they're all skilled flyers, and even more important—trained instructors. Here at my school is the right place to get the best start for success.

PRICES WILL ADVANCE SOON

I've built up a wonderful school, because I give every student his full money's worth and I keep these courses just as low as is consistent with the best training. However, in keeping my school up to these high standards, I find it necessary to continually increase my equipment and personnel and I know that sometime soon I shall be forced to increase the tuition prices. So take advantage of these low prices NOW......while you can.

COMPLETE GROUND AND MECHANICS COURSE—Covers all the practical training of building and overhauling of airplanes and airplane motors. Makes you a first class mechanic and airplane builder—fit for a high pay job...............$175.00.

COMMERCIAL PILOT COURSE, 60 HOURS—This is the course for those who would make commercial aviation their vocation. It gives you 50 hours solo flying time, ten hours dual instruction and our complete ground and mechanics course. If you intend to enter aviation in the big pay class, this is the course for you. Includes navigation, meteorology and air traffic regulations. All latest flying knowledge....................................$850.00.

STUDENT FLYING COURSE—Ten hours flying time, including one SOLO FLIGHT and complete ground and mechanics course. When this course is completed you are permitted to take the plane and fly by yourself..............................$375.00.

TRANSPORT PILOT COURSE, 200 to 220 Hours—The transport pilot is the highest paid. He must have at least 200 solo hours. His salary usually runs from $350 to as high as $1000 a month. This is my finest course; it includes 10 to 20 hours dual instruction, 200 hours solo flying, the complete mechanics and ground course, navigation, meteorology, air traffic regulations and other late flying courses. You'll pay for the training inside of a few months at the big wages it will qualify you for......$2600.00.

I'LL GUARANTEE A JOB

To every student who successfully completes my transport course and becomes a licensed pilot I will guarantee a good job at excellent wages. This offer is good for anyone enrolling in my transport course during the next sixty days.

Get This Book—FREE

Before a student enrolls in any school he should make careful investigation of what other schools offer. That's why I want every prospective student to have a copy of my new book, "Your Future in Aviation." So don't delay, but write today and get your copy.

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Address ....
City.............................. State..........
I want full information on..........................
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The "Aviator" $2

Pliers with "human intelligence"

The Pliers of "A THOUSAND USES"
Here are a few of them:
Tie Rod Terminals
Strut and Cable Adjustments
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Valves, Cocks and Similar Fittings
Nuts of All Kinds, Crank Case Housing, etc.
Cotter Pins
Spark Plugs
Battery Terminals
General Electrical Work, etc. etc.

No. 67—"Aviator," 7"—$2.00
No. 66—6"—$1.75
No. 65—5"—$1.50

A VacuumGrip pattern designed specially for the aeronautic and automotive mechanic who appreciates real tool "quality."

Your name etched FREE on handle

THE "intelligence" that is built into these pliers by skilled tool designers lightens your daily labors and gives greater speed and precision to your hand. No other pliers are capable of doing such a wide variety of jobs—and doing them so well.

The two-adjustment slide joint takes rods and nuts up to 1 in. There's a giant's grip in the strong, powerful jaws, fitted with special milled teeth, for better holding. Note the long, slender nose, tapered in both dimensions, enabling you to get action in confined spaces. And what a pair of cutters!—built of that hard, tough steel which has made the Vacuum Grip name famous.

The *extra long life* of Vacuum Grip Pliers is the result of finest alloy tool steel, individually hardened under special liquid heat process and electrically and oil-tempered *thru and thru;* NOT CASE HARDENED open-hearth steel, like ordinary pliers.

FORGED STEEL PRODUCTS CO., NEWPORT, PA.

If your dealer can't supply you, send to us direct. We pay parcel post. Write for catalog showing over forty patterns and sizes.

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Forged Steel Products Co.
Newport, Pa.
Enclosed is Money Order for $..... for which you are to send me Vacuum Grip Pliers No. 67—"Aviator"........
No. 66 ....No. 65 ....
Mark X for plier or pliers wanted
Name ....
Street .... City & State ....

(*Continued from preceding page*)

manner, instructors, employees and students are required to purchase uniforms. The college maintains contact with the United States Army and Navy flying schools, and has modeled its curriculum and equipment after those of the Government institutions.

OPERATION OF THE LONGEST AIRLINE

(*Continued from page* 45)

The late Edward Hubbard, who, as vice president in charge of operations, first shouldered the responsibility of organizing and keeping the traffic moving, laid down several cardinal principles. One was that the mail must go through on schedule if possible, but safety was the controlling factor. On-time delivery of the mail was next most important. Cost was to be a secondary item when the safety or the regularity of the service was concerned.

The Boeing operations department really begins at the factory, because the experience derived in flying the route serves as an aeronautical laboratory. It has been a rule that pilots must make recommendations on ways in which planes or service can be improved, with the result that designers in the plant have been enabled to incorporate many practical changes. This close coöperation between the factory and the operating personnel is one of the basic reasons for the quality of Boeing planes and service.

How does the Boeing System plan its operations and service its planes?

Operation headquarters are at Salt Lake City, but at each division point the Boeing organization has established an adequate service department. Consequently, at approximately every 400 miles, planes can be completely serviced and repaired. When a Boeing plane comes in after a regular flight, it is washed, refueled and oiled and is thus ready for immediate service should an emergency arise necessitating the use of the plane outside of its regular schedule. After the plane has been washed and refueled, a systematized inspection begins. As a rule the superintendent assigns two men to each plane, of whom one is an engine specialist and the other skilled in rigging. An effort is made, however, to secure mechanics who are competent to work on both planes and engines.

A standard inspection sheet is used to record routine inspection and servicing. The Boeing check-up is such that responsibility can be definitely fixed should there be any failure to make a required check or complete necessary repairs. There are sixty-three items on the inspection sheet to be checked, and initialed if the item is correct. The engine inspection calls for nineteen sub-division checks. There are nine for the fuselage, seven for the wings, with provisions made for checking the landing gear, controls, lighting system, empennage, and adjustments. Approximately six man-hours are required for the complete inspection of each plane. After it is finished and repair work done, the mechanic makes a test run of the engine, and when satisfied with it, signs the sheet signifying its readiness for the pilot. The latter, however, goes over his ship and signs the sheet when he considers it in perfect condition. After each 200 hours, every propeller is dismounted, etched and inspected with a magnifying glass. All engines are completely overhauled every 200 hours, although that is probably more frequent than is necessary.

Boeing Air Transport keeps one complete spare engine on hand for every three planes in service. Engine parts for the system are kept mainly at Oakland, Salt Lake

(*Continued on next page*)

Know these Monocoupe Facts

Ninety Percent of American light planes in 1928 were

Monocoupes

More Monocoupes sold during first year of production than any other commercial plane in history of the industry.

Service Stations in over a hundred airports.

Out of the large number of Monocoupes in service in 1928, the majority in hands of amateurs, there were fewer fatal accidents than sustained by the few well known multi-motored planes in service which were piloted by men of long experience.

Monocoupes have never failed to win prize money in any race meet although they were always matched against motors of approximately twice the horsepower or more.

No commercial airplane is subjected to the vigorous stunting given the Monocoupe.

There has never been a structural failure.

It is not only approved by the Department of Commerce but all materials and workmanship viewed by a government inspector on duty at all times.

Instruction time before solo has proven materially less.

A new standard of uniformity and interchangeability of parts.

The Monocoupe is one of the very few planes sold with a guarantee that includes the plane and motor as a single unit.

The Monocoupe is still the lowest priced approved plane in the world and will continue to give the greatest value for every dollar.

$2675

Flyaway at Moline, Illinois

MONO-AIRCRAFT CORPORATION

A Subsidiary of

Allied Aviation Industries

MOLINE, ILLINOIS

ALCO JR.
COUPE MONOPLANE

Uses any 2, 3 or 4 cylinder motor of 28 to 40 H.P., weighing up to 160 lbs. Very easy to assemble.

MANUFACTURED PARTS SOLD IN EIGHT $25 GROUPS

Sent to you EXPRESS PREPAID

NUMBER ONE
- 4 finished Wing Beams of "A" grade spruce
- 400 ft. rib material of "A" grade spruce
- 10 sq. ft. fiber for Rib Joints
- 1½ lb. small rib nails
- 1 lb. Monite Waterproof Glue
- 1 Full size Wing Curve on heavy paper

Immediate shipment. Get your ship started by ordering today!

A SPECIAL

6 ft. 6 in. propeller for Alco Jr., only $17.50, Express Prepaid.

BLUEPRINTS

Four large sheets with instructions on the drawings, telling What to Do and How. Sent Postpaid for $2.50.

Illustrated circular for the asking.

ALLISON AIRPLANE CO.
LAWRENCE, KANSAS

Join an ASPA FLYING CLUB

Airplane FREE!

By enrolling as a member of **THE AMERICAN SOCIETY FOR PROMOTION OF AVIATION**, you can help us—with the aid of the country's most prominent "air-minded" individuals—to influence Congress to follow the lead of Canada by appropriating $40,000,000 to supply airplanes gratis to every Flying Club of fifty members. We have already organized over 500 Flying Clubs. Will you help us organize one in your community? All ASPA members receive special courtesies at Airfields and Factories and secure practically 25% discount on all aeronautical books and equipment purchased through National Headquarters.

ASPA Home Study Course
Complete for $1.00

This Course is endorsed and recommended by America's leading airmen and leading students of aviation, as the most complete, the soundest, clearest and most informative of any Course ever prepared. It teaches you the fundamentals of aviation and materially cuts down the number of hours necessary before qualifying as a flier. Membership in the ASPA, including Silver Wings (pictured below) is but $1.00. The Complete Home Study Course, including Blue Print of a Model Airplane, is also $1.00. Show your spirit and patriotism by lending support to this national determination to "Make America Supreme in the Air." Use coupon below—TODAY!

SECRETARY, ASPA, Dept. AD-6, 522 Fifth Ave., New York.
☐ I enclose $1 for Membership in ASPA, including Silver Wings, Membership Card and literature of the Society.
☐ I enclose $1 for ASPA Complete Home Study Course in Aviation, including Blue Print of Model Airplane.
☐ I enclose $2 for both Membership and Course.
Name ....
Address..............................City and State.....

(*Continued from preceding page*)

City and Omaha, where engine overhauls are done, but spare engines are distributed to various points along the two lines.

The entire Boeing fleet is powered with Pratt and Whitney engines, which were chosen after the Boeing company had made an extensive study of engine requirements both here and abroad. At first only Wasps were used on the transcontinental route. Later, when mail loads increased, the Chicago-San Francisco planes were powered with Hornets. The Pacific Air Transport fleet, operating up and down the Pacific Coast, has Wasp engines.

The same care is exercised on batteries and magneto repair work. Armatures are recharged whenever the engine is overhauled and at such other times as it seems necessary. Spares are always kept on hand to guard against any possible delay. The Company carries a considerable stock of spare parts of all kinds, those for the transcontinental operation being concentrated generally at Salt Lake City.

Boeing pilots carry few spares or tools;—a small kit of tools sufficient for adjustments and a few spark plugs.

The Boeing System is perfecting plans for supplementing its present transcontinental service, by adding trimotored eighteen-passenger transports. A fleet of these transports is now being built at the Seattle factory. They incorporate refinements of the model 80, a twelve-passenger plane, four of which are now in operation between San Francisco and Los Angeles. The Boeing System, in transporting nearly 6,000 passengers on the cross-country and coastwise routes has learned many things which will be to its advantage when it, as the pioneer transcontinental air passenger carrier, puts its fleet of big planes into operation this year.

With the background of valuable experience, it is safe to predict the Boeing System will be able to guarantee the traveling public every comfort, safety and convenience which all forward looking progressive companies should hold out to their patrons.

BIGGER AND BETTER BALLOONS

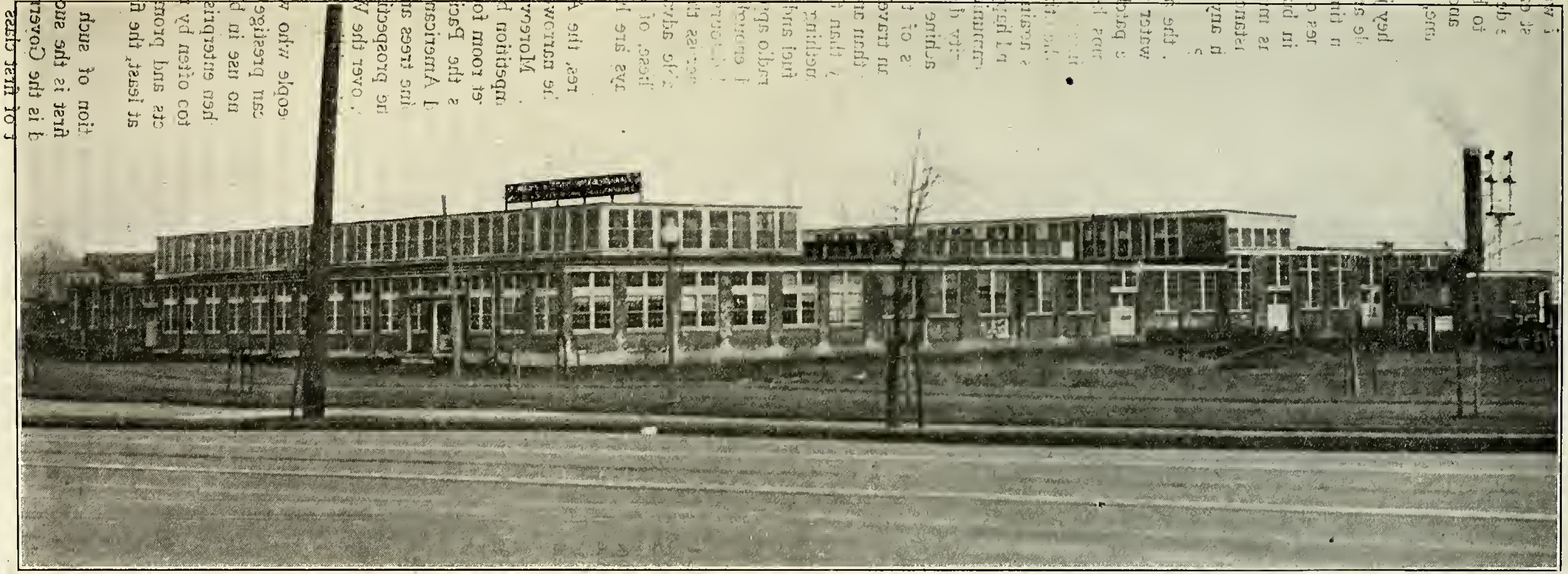
(*Continued from page* 58)

Aviation Week by completing a thousand mile jaunt which is still quite a distance for any craft of land, sea or air. Throughout her career to date she has behaved as a good little airship should, and is a credit to the lighter-than-air idea.

The two new ships which will be assembled soon at Akron are for the Navy. They are warships of the air, with fighting planes in their insides and a mean disposition when roused. But behind and beyond them may be seen the shadow of future commercial craft, based on their experience and using the skill and machinery and equipment gathered from all over the world for their construction. Somebody had to build these first ships, and it's a perfectly good idea for the Navy to do it. The whole job won't cost as much as a single battleship, and the probable profits of the undertaking make a battleship look like a waste of time and money.

They represent a perfectly sound idea from a military point of view. They promise to be an essential link between surface craft which patrol the high seas and the coastwise defenses of fighting planes. Their effective range is three or four thousand miles and they can stay in the air away from their base of supplies for a week. They can survey three hundred square miles of sea at a time, and by radio communication direct the fleet below. They will

(*Continued on next page*)



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ADDRESS AERO DIGEST, BOX 820

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AND MANUAL OF RATES
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"AIR EAGLE" THE PERFECT SUIT FOR FLYERS

Roomy, yet tailored looking, Air Eagles have adjustable Belt and Ankle straps, close fitting cuffs and diagonal Breast pockets.

Hundreds of the flying fraternity men wear

AIR EAGLE AVIATION SUITS

Made of best heavy weave materials—any name, insignia, etc., embroidered on back in non-fading colors.

PRICES

1 to 5 Suits or Coats, per Garment	$3.00
6 to 12 Suits or Coats, per Garment	2.88
13 to 25 Suits or Coats, per Garment	2.75
24 to 50 Suits or Coats, per Garment	2.50

Sizes 36 to 46.

Special Prices on Larger Quantities.
We embroider 25 letters or under, on your suit, for 25c

FREE OFFER! To encourage introduction we will, for a limited time, give ONE "Air-Eagle" Suit FREE with each dozen purchased. Get the order in NOW!

Order from this ad or send name to nearest office for FREE SWATCHES and Circular.

AIR EAGLE MFG. CO.
Dept. 684
816 Central St., Kansas City, Mo.

(*Continued from preceding page*)

be able to take care of themselves in any sort of weather short of hurricanes, and they can fly high and fast enough to ignore any enemy save the fighting plane. The development of the mooring mast has made them easy to handle in port, so that a score of men can tie them up and they can stay hitched to the mast for months at a time, using the big hangars only as dry docks.

But these facts are interesting chiefly because they justify what is in fact an expensive experiment. People are still prone to ask what such ships are good for in times of peace, even if they admit their usefulness in times of war. And there is no doubt that the Government in building them has its eye on commercial possibilities as much or more as on military usefulness. What, for instance, can you do with an airship that you can't do with any other craft designed by the fertile ingenuity of man?

As far as America's present program goes, the answer lies in the fact that there is a great deal more water in this world than anything else. The continents are patches on a water-logged globe, and there are big jumps between them. Two of these jumps are particularly interesting to America, one of them being the Atlantic and the other the Pacific. These are very handy water hazards against foreign interference with our own private peace and happiness, but they also slow up the more peaceable communications between nations on which the world's prosperity depends.

The first essential of any useful flying machine is that it shall have somewhere to go. These ships of the air, which don't give a hoot for highways and can travel 2,000 miles a day, can cross an ocean more quickly than anything save the airplane, and can do so more safely than the airplane because they need not come down if something breaks. Moreover, they can carry something beside fuel and a ham sandwich; they can carry a fair-sized crew, radio apparatus, a pay load of passengers and freight, and enough extra fuel to provide for emergencies, delays and detours. The best prospects for commercial airships lie across the seas, because they have definite and demonstrable advantages there over other means of locomotion. These, of course, are speed and comfort, which in these days are luxuries for which the traveller will pay cheerfully.

Of the two oceans that crowd our shores, the Atlantic is the more susceptible to bad weather, the narrower, and the one most travelled by crack liners. Moreover, the Atlantic is already a scene of airship competition between England and Germany, and there is not yet room for much more. But four thousand miles across the Pacific lies Hawaii, which is a place where all good Americans want to go to eat pineapples right from the pine trees and give the once-over to the hula maidens. The prospective airlines for American airships lie, therefore, over the Western sea, and unless all signs fail there will be airliners there within two years.

This is important not only to the people who want to float and run the lines, but to American prestige in the new phase of transportation. There's no use in blinking the fact that first come is first served when enterprise plays a new tune. We have lost advantage too often by moving slowly, to dare to ignore the prospects and promises of airship operation. Across the Pacific at least, the first airship lines should be American lines.

The likelihood of quick inauguration of such service depends on two chief factors. The first is the success of these two ships at Akron; the second is the Government's willingness to turn over the transport of first class mail to

(*Continued on next page*)

YANKEE

the

NEW SERIES SIEMENS

YANKEE "5" 80 H. P. (SH-13)
YANKEE "7" 110 H. P. (SH-14)
YANKEE "9" 125 H. P. (SH-12)

RADIAL AIR-COOLED ENGINES

with 5 factors of paramount interest to the American plane-builder

1. DESIGN—First designed and built by Siemens, a giant engineering firm with 130,000 trained workers.

2. QUALITY—The performance of the Yankee Series is exceeded by no other engine in efficiency, smooth running and dependability.

3. AVAILABILITY—The Yankee Series are ready for immediate delivery in quantities commensurate with your needs.

4. PRICE RANGE—Costs are in direct line with the prevailing market prices of engines far below the standards of Siemens power units.

5. SERVICE—A nation-wide factory-trained-man service for the Yankee Series available.

K. G. FRANK General Representative for SIEMENS & HALSKE, A. G.

Consulting Engineer
75 WEST ST,, NEW YORK

[Watch this space for detailed description of the NEW SERIES SIEMENS]

Learn to FLY

Under the personal supervision of

CAPT. JOHN O. DONALDSON

President of the

NEWARK AIR SCHOOL

Capt. Donaldson, noted American War ace, has been decorated by General Pershing and the Prince of Wales. He has been flying continuously for eleven years—and is an outstanding authority on aviation. Captain Donaldson gives his personal attention to all students.

Average enrollment is 200 students . . . the limit 275. Elementary and advance courses by a staff of expert transport pilots each with at least 10 years' flying experience. Ten latest-type planes for student instruction.

Students are especially trained to pass Department of Commerce examinations for all types of licenses. Courses from 4 weeks to 14 months. Rates $275 to $4,400. *Write for catalog.*

TRAVEL *by* AIR

Our comfortable, latest-type planes are ready to take you anywhere, anytime—on long or short flights. Special excursions to Philadelphia, Atlantic City, etc. Phone for quick service.

NEWARK AIR SERVICE INC.

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Authorized Dealers for Travelair and Mohawk Airplanes

Newark Metropolitan Airport, Newark, New Jersey

Telephone Mulberry 1310

(*Continued from preceding page*)

the airliners. The second depends to a considerable degree on the first. If airships can prove their reliability and stability and safety, their advantage of speed means much to the mail. Moreover, the Postoffice Department has been admirably willing to encourage air transportation by granting mail carrying to airlines wherever possible. With such an indirect subsidy from mail-carrying profits, passenger rates by airship can be brought down to the point where people will be ready to pay them.

In this program, America has very considerable advantages. In the first place, the craft now building have the skill and experience of the Zeppelin builders behind them. The pick of the German shops are now on this side of the Atlantic, and there will be no such mistakes as wrecked more than one experimental ship in the past few years. Secondly, there is plenty of money here, and it takes money to build airships right. Third, there is business here, and a travelling public that is friendly to the new thing. Fourthly, there is helium, which is nature's most generous contribution to our airship program. The familiar advantages of helium are made more impressive by the disappointing delay to the *Graf's* attempt to cross the Atlantic for a second time. The new American ships, helium filled and safe from fire, will not only be more comfortable because heated and equipped with cooking facilities, smoking rooms and all the comforts of home. They will also carry all their essential arrangements within the hull, which is where they will be found in a ship of the sea. Nothing but the propellers stick out beyond the smooth outer jacket of these leviathans of the air. Engine trouble does not mean a precarious job of repair in a tiny gondola slung above thin air, but a comparatively safe and simple job within the ship itself. Since an airship underpowered is in danger of every breeze that blows, the ability to care for engines in flight is essential, and this the American ships will have to greater degree than any aircraft yet built.

It looks like the airships turn. The bigger and better balloons are coming back into the picture, and it seems likely that America will have a large share in putting them there. Later on, it will be the public's job to keep them there, by giving them business so far as they deserve it. The public has done right well by the airplane, and it's a fairly safe bet that the airliners will not lack customers when they are ready to fly.

CONGRESS LEGISLATES FOR THE SKY

(*Continued from page* 46)

is similar provision for the examination and rating of airmen serving in connection with aircraft of the United States and the issuance of airman certificates. These latter are comprehensively defined as:

"Any individual (including the person in command and any pilot, mechanic, or member of the crew) who engages in the navigation of aircraft while under way, and any individual who is in charge of the inspection, overhauling, or repairing of aircraft."

The Secretary is empowered to provide for the suspension and revocation for cause of such registration, aircraft and airman certificates as have been issued. His rules and regulations for the enforcement of these provisions have the effect of law in the same manner as do those of the Secretary of the Treasury in connection with the Federal Income Tax. Those who elect to have their aircraft registered under the Act are bound by them.

Now comes the trick. It is made unlawful to navigate any

(*Continued on next page*)

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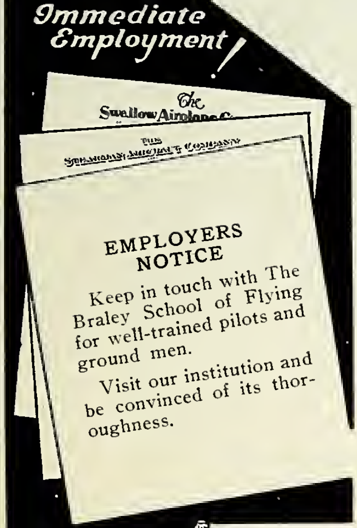

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Prepare yourself for highly remunerative specialties in the fast-growing business of aviation. Whether you fly or not, many opportunities await you if you train for one or several of the numerous ground branches of the industry through the systematic courses at the Braley School of Flying.

In Wichita alone, with a dozen airplane factories and additional related industries, hundreds of well-trained men are in constant demand. Aviation interests throughout the world look to Wichita for planes and experts. The logical place to LEARN is HERE, at the AIR CAPITAL, where you associate with established experts and where famous aeronauts from elsewhere frequently come.

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Young men ready to start and older men with previous experience will find The Braley School of Flying the ideal place to perfect themselves. Right now men who have been in the game are training at Braley School for bigger positions. You, too, should come and learn where future leaders are learning—

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The Braley School of Flying, Inc., has its own 313 acre field. It has a group of modern brick and steel buildings, adequate equipment, and a high class personnel. Men—or women—who come in earnest are destined for success with the help of the Braley School O.K. The value of your training here is recognized by employers everywhere.

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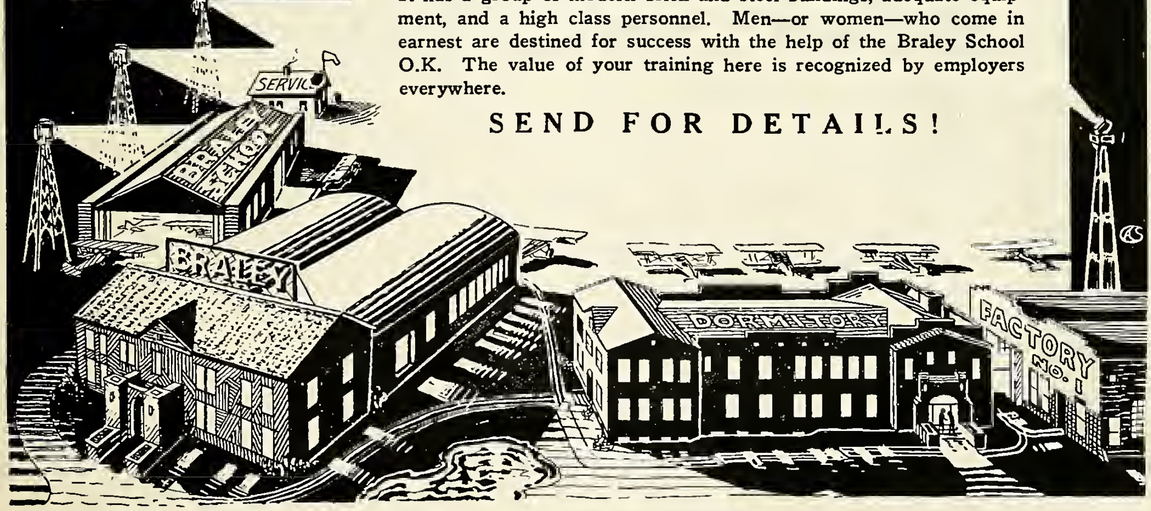

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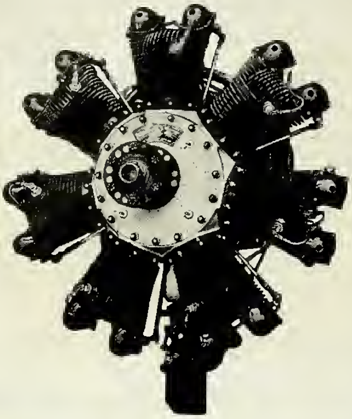
LE BLOND "90"



THE 7-cylinder *Le-Blond "90"* is the same great engine as the 5-cylinder *Le-Blond "60"* -- the first and only aircraft engine in its class thus far to pass the rigid United States Navy test -- except that two cylinders have been added to obtain increased power. Both engines are unparalleled for performance in their respective hp. ratings. 90% interchangeability of parts.

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(Continued from preceding page)

aircraft in interstate or foreign commerce unless it *is* registered as an aircraft of the United States, and also to navigate any aircraft so registered without an aircraft certificate or in violation of its terms. Furthermore, it is unlawful to serve as an airman in connection with any aircraft of the United States without an airman's certificate, or in violation of its terms. It is obvious at a glance that a very large part of the aircraft in the country is affected by these provisions. Moreover, to have one's aircraft registered as an aircraft of the United States gives both owner and craft a desirable status. Finally, the traveling public will be quick to sense its protection in the observance of these provisions and will demand compliance with them.

The effect of their efficient enforcement is that no aircraft will take the air to engage in interstate or foreign commerce unless and until it shall have been registered as an aircraft of the United States; it shall have been inspected and rated as to its airworthiness; and licensed with an aircraft certificate. Furthermore, the commander, pilots, mechanics and crews together with whomsoever was in charge on the ground of its inspection, overhaul and repair, will have to be equipped with airman certificates, which presupposes examination, rating and licensing. These requirements are akin to those which have existed for many years with respect to maritime navigation and should equal their degree of efficiency.

There remains one other vital aspect of the duties of the Secretary of Commerce with respect to regulation. He is required to devise and enforce rules of the road. These rules are not confined to aircraft engaged in interstate or foreign commerce but apply to *all* aircraft. Evidently the framers believe that the paramount necessity for uniformity in aerial traffic and navigation sufficiently hinges such rules with interstate commerce, the source of Federal power. But what of the case of the plane operated entirely within the confines of a single state and for purely private purposes? The courts may have something to say on this question.

Be that as it may, the need for such rules is apparent to any observant person who has attended an air meet. Aircraft assemble from all parts of the neighboring country and distant points. They are of every type and description from single-seaters to trimotored passenger ships. On the field they line up in rows three deep extending half a mile or more, their multi-colored wing sections and marking devices making a fantastic scene of a collection of huge mechanical dragon flies. Aircraft are in the air the day long, singly and in squadrons, darting this way and that and swooping down to land. There is formation flying, racing with congestion at the pylons, bomb-dropping and acrobatic work. The while in a neighboring field some barnstorming pilot is up and down from dawn to dusk giving joy hops to the curious. After dark, groups of three fleeting stars bespeak night flights to home airports. Similar conditions exist at any busy airport in the country.

The regulations devised to cover this problem are known as the Air Traffic Rules. They form Chapter 7 of the Air Commerce Regulations, a copy of which should be in the kit of anybody who is directly connected in any capacity with aeronautics. The Rules, which have been framed to cover all types of both heavier and lighter-than-air craft, are terse and simple. They form a satisfactory code for aeronautical operations throughout the country. Certain salient rules will be of interest to the public.

That as to minimum altitudes of flight may be simply stated. Exclusive of landing and taking off, ordinarily

(Continued on next page)

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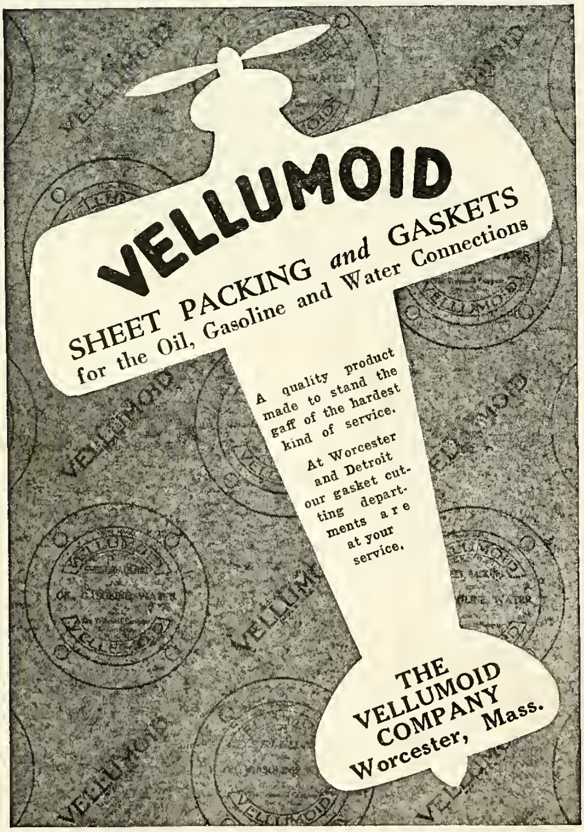

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(Continued from preceding page)

it is 500 feet. Over congested areas or an open air assemblage aircraft must ascend to 1,000 feet. Stunt or acrobatic flying, which is defined to be intentional maneuvers not necessary to air navigation, is forbidden over such areas and assemblages and also over landing fields and airports and within 1,000 feet horizontally of any of these. It may be indulged, providing no pay passengers are carried, above 2,000 feet on civil airways and above 1,500 feet elsewhere.

As to rights of way generally aircraft keep to the right. Three hundred feet is the minimum distance for proximity Approaching aircraft give way to the right. This is the same rule as applies at sea. Similarly, in the case of crossing aircraft, that which has the other on its right hand must keep out of the way. An overtaken aircraft has the right of way and the overtaking plane is to alter its course either to right or left and not fly above or below the overtaken ship.

Aircraft must be landed and taken off up-wind when practicable. A landing ship has the right of way, and as between two or more aircraft maneuvering to land, the one with the lowest altitude has the right of way. The requirements as to lights are similar to those in force at sea. There is one rule that deserves quotation:

"The air traffic rules may be deviated from when special circumstances render a departure necessary to avoid danger or when such departure is required because of weather conditions or other unavoidable cause."

A wise provision this, stressing as it does the resource of the pilot.

While no violation of the Air Traffic Rules has as yet come before the courts, the entire range of them has been broken. The Department has handled a large number of cases calling for disciplinary action. The question of dangerous flying has, however, been presented in some courts. The London *Times* of May 26, 1927, yields the report of an interesting case—Rex vs Reed. This was tried at the Dorset Assizes before Mr. Justice Avery. Reed was a farmer. He had been continually annoyed by the passage of aircraft over his property at what he considered too low an altitude. The noise disturbed his invalid mother and frightened his livestock. He had made complaints about it to the local police. One morning a plane passed over at an altitude of about sixty feet. Reed went into the house and procured his shotgun. The same plane reappeared. He raised his gun and fired two shots in the air.

He was arrested and indicted for a common assault. He claimed that he fired after the plane and that his firing was intended as a warning. The court ruled that the question was for the jury. A verdict of not guilty was returned. At the same time the foreman announced that the members of the jury desired to associate themselves with a previous recommendation by the Grand Jury against low flying by airplanes. Thus one learns what twelve Englishmen, tried and true, think of dangerous flying.

On August 8, 1927, Lieutenant Colonel George Henderson was charged before the Berks magistrates at Windsor Guildhall with unlawfully flying an aircraft in a dangerous manner. Police officers testified as to the low flying and the consequent arrest. Colonel Henderson submitted evidence of a good record in the past; that he had done no stunt flying; and that he had his official license as a pilot. The magistrates decided that Colonel Henderson had flown low to the danger of the public but having regard to his previous good record, they ordered him put on probation.

These instances are, of course, prosecutions for petty

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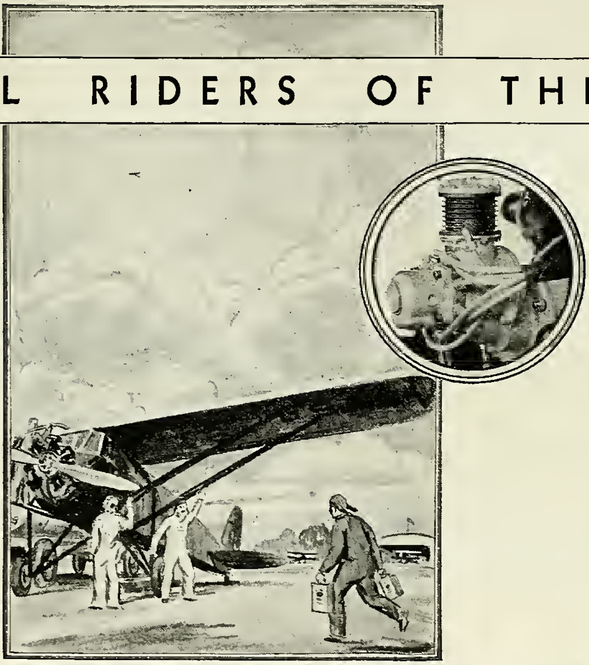
—FOR ALL RIDERS OF THE SKY



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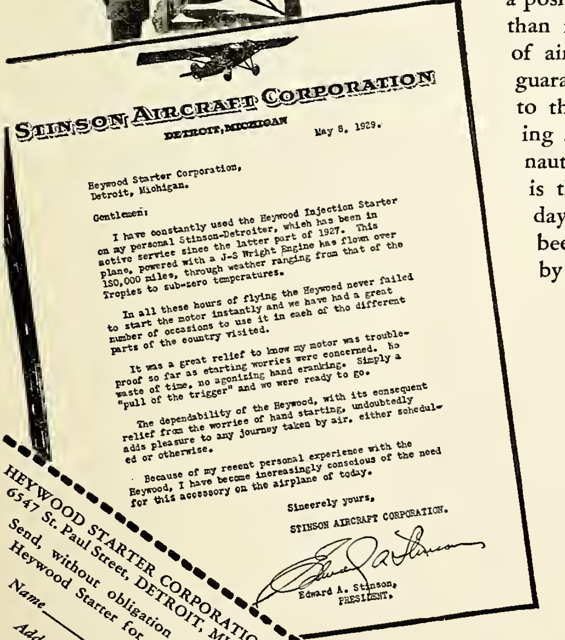

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The dependability of the Heywood, with its consequent relief from the worries of hand starting, undoubtedly adds pleasure to any journey taken by air, either scheduled or otherwise.

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Sincerely yours,

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Edward A. Stinson

Edward A. Stinson,
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Today, when the airplane is the very synonym for "split-second" utilization, the *Heywood High Pressure Injection Self Starter* is a positive time saver on the "getaway." But—*more important* than its tremendous efficiency in the instantaneous starting of airplane engines, under *all* conditions, is the additional guarantee it affords against the hazards of accident incident to the obsolete method of "prop" or "hand-crank" starting . . . ¶ Because it typifies the new limits to which aeronautical science has progressed, the *Heywood Self Starter* is the subject of conversation wherever flyers gather today — For, while it is as new as now, it has nevertheless been proven for *dependability, convenience* and *economy* by those who have made and are making air history!

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offenses. Nevertheless, they are indicative of a condition. Such cases may be expected to come before the courts with surprising rapidity. Already enterprising communities have incorporated by municipal ordinance the regulatory provisions of the Air Commerce Act. Such ordinances forbid flight except in licensed aircraft operated by licensed pilots. Thus compliance with the Air Traffic Rules in that vicinity is assured and violations of them may be prosecuted by local authorities.

The encouragement of air commerce is the other main head in the Air Commerce Act. The Secretary of Commerce is to "foster" air commerce. Any consideration of this subject soon resolves itself into a description of the accomplishment of the Department of Commerce in connection with aeronautical activities during the past three years. As a logical result of the provisions of the Act, the Aeronautics Branch of the Department of Commerce came into being. It comprises five separate divisions:

Air Regulations Division
Airways Division
Airways Mapping Division
Aeronautical Research Division
Air Information Division

The Air Regulation Division is concerned with the enforcement of the regulatory provisions of the Act and the departmental regulations. To give some conception of the detail involved, it may be noted that the personnel comprises, among others, a medical director who has charge of a nation-wide corps of 250 medical examiners, who in turn give physical examinations to applicants for pilots' licenses. There are also upwards of thirty experienced men employed as aircraft and engine inspectors. These men supervise the examinations in theory and flight of prospective pilots and mechanics. The enforcement of the Air Traffic Rules is dealt with by this division, which is equipped with aircraft to facilitate its functions. An important detail that comes within its purview is the investigation of accidents. Here we have a "crash board," familiar to war-time pilots. Considerable progress has been made along this line and the analyzed results fly in the teeth of much popular misconception.

In the six months period from the first of January to the first of July, 1928, there were reported and investigated 390 accidents. Of these, 69.73 per cent occurred in the course of miscellaneous flying. Student instruction came next with 17.69 per cent. Schedule flying on airways was but 8.72 per cent and the balance of 4.36 per cent was in experimental and test flights. With respect to the causes, 46.74 per cent of the accidents were ascribed to errors of pilot and personnel; 22.35 per cent to material failures; 24.13 per cent to miscellaneous causes comprising weather, darkness, terrain and the like; and the balance of 6.78 per cent to undetermined causes.

In this array of figures, one tends to stress the high percentage of accidents in miscellaneous flying and the very low percentage in schedule flying on airways. Add to this fact that nearly half the failures are ascribed to errors in piloting and you have a rough index as to the safety of aircraft. An analogy to the automobile casualty lists in any Monday morning paper springs instantly to mind. The compilation of such data will be of great aid in increasing the safety of flight.

A distinction is taken in the Act between airways and airports. Airports are deemed to be of local concern and

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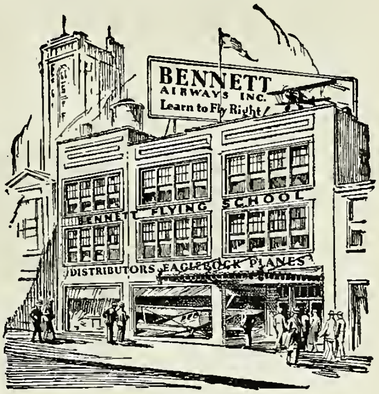
LEARN AVIATION Where You Can Check These Requirements SIDE BY SIDE---



*The NEW U. S. Rules and Regulations for Schools:

(H) Minimum Curricula Requirements.

(2) Limited Commercial Pilot's Flying School.

The school shall give the student a minimum of 50 hours total flying time, of which not less than 15 hours nor more than 25 hours shall be dual and check time, and as such be counted toward the solo flying experience required for Limited Commercial License.

* * *

(3) Transport Pilot's Flying School.

(a) Flying Time—The school shall give the student a minimum of 200 hours total flying time of which not less than 35 hours nor more than 50 hours shall be dual and check time and as such be counted toward the solo flying experience required for transport pilot's license.

(b) Experience on various types—Each graduate shall have a minimum of ten hours' solo experience in flying each of two distinct types other than those used for primary dual instruction. He shall also have ten hours solo on at least one type of cabin plane which shall not be less than a 4-place type and which shall be loaded to normal capacity during these prescribed flights. He shall also have ten hours' solo experience in night flying.

* * *

E. Number of students per plane. Not more than fifteen students shall be enrolled in flying courses for each airplane normally available for flying instruction purposes.

Time limits of course. The entire course, both ground and flight, shall be completed within a minimum length of time, the maximum allowable time being three months for private school, six months for limited commercial school and eighteen months for transport school. There shall be a regularity of procedure of instruction, both ground and flight.

The BENNETT System —Famous for a Higher Training Standard:

The Bennett Limited Commercial Course includes 50 hours of flying after solo, including ground mechanics instruction, aerodynamics and meteorology, theory of flight, nomenclature, rigging and repair of various types.

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The Bennett Transport Course fits you for any flying job! Including 200 hours of flying and cross country flying after solo, experience on various types, (new Eaglerock Bullet cabin equipment being added immediately).

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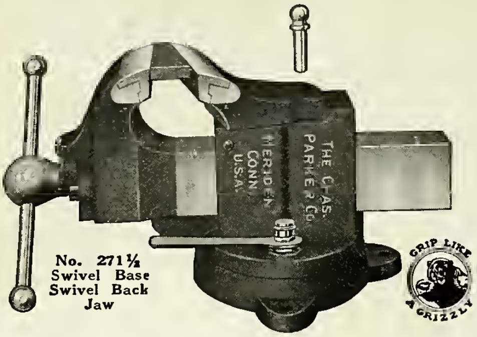

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(Continued from preceding page)

their construction and development is left to State, municipal and private enterprise. Nevertheless, it is the duty of the Secretary of Commerce to encourage this activity and much assistance is being given in the form of expert advice as to locations, construction, equipment, marking and operation. A series of ratings has also been established. For local regulations many airports have adopted a set of field rules advocated by the Department.

The beacons of the air quite naturally take their place beside the beacons of the sea. Thus the detail of the work on airways is handled by the Airways Division in conjunction with the Bureau of Lighthouses. Here again personnel tells the tale. There are upwards of 500 persons on the roll in eleven different capacities varying from weather observers to radio electricians.

Cross-country flying is the backbone of any extensive development of commercial aeronautics. In the old days when aircraft were equipped with compasses that found the North at any convenient point on the horizon, altimeters that were prone to register 500 feet altitude after a fast landing, and other interesting but unreliable apparatus, a pilot's aids to navigation were his wits, a knowledge of the terrain nursed by observation and a God-given sense of direction. In some men these qualities were developed to an uncanny degree and a thick fog or a blinding snowstorm alone deterred them. These men remained at such work. Others who were constitutionally incapable of distinguishing the contour of Philadelphia from Podunk, but who might nevertheless be excellent pilots, found their work in test flying and in other lines.

Flying on the modern airway presents a very different aspect of the problem. Suppose you are cruising along one of these aerial paths in a ship equipped with up-to-date instruments and devices. It is an hour before sundown. The weather is clear. The motors roar with the contented purr of some colossal kitten. You glance below. The terrain is broken farming country dotted with wood-lots and criss-crossed by roads. Almost directly beneath a yellow streak catches your eye. It is a broad arrow pointing in the direction of your course painted on the flat roof of a small house. At the feathered end is the number forty. Beside it is a trellised tower. This is a light beacon. The yellow arrow is a day marker. The number bespeaks mileage.

This is interesting. A bit farther on a factory roof yields courses and distances in block letters. The existence of Sachem Glue and Empire City remain in your mind together with the aerial information. Good advertisement that. The next beacon site is on top of a bluff rising sheer from the bank of a winding strip of silver. Your glasses reveal the existence of a wind vane, a set of four cups mounted on crossed arms that spin incessantly, and a small flag fluttering from a slender pole. This is the apparatus of the weather man. It is the site of a meteorological station.

On the earth it is dusk. The sun has set. At your height the red disk rests lightly on the horizon. Just ahead is visible a large white circle from which white lines lead away broad paths. A series of smaller white circles outline a rectangular plot, at one side of which is a group of buildings. At that moment lights flash, white around the border, green on the paths leading to the center circle, and here and there a red bespeaks some obstruction. This is an intermediate landing field. The pilot reaches for a switch. In that instant there is a red glow on the left wing and a green on the right. On the tail is a fixed

(Continued on next page)

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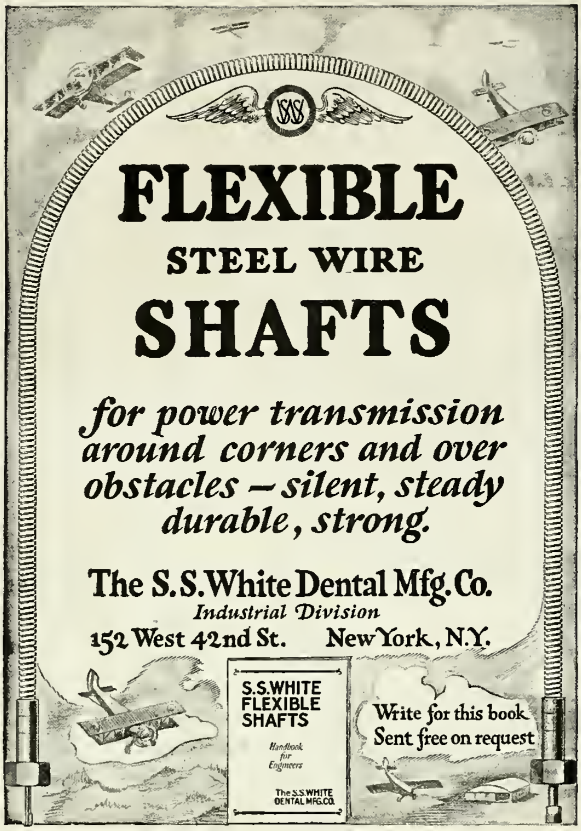

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(*Continued from preceding page*)

white light. The darkness gathers fast; more lights gleam.

Ahead on the course lies a series of lights that rotate and flash, each with a meaning of its own. Suddenly the relief jogs the arm of the pilot and points ahead off the course to the right. There a beam shoots aloft at alternating intervals. Each looks puzzled. Notes are taken. An investigation will follow. Doubtless it is some advertising scheme. In due course this offending light will be either made to conform or its existence wiped out.

There come forward scribbled notes from the radio operator. There is fog ahead. Pilot and relief adjust the earpieces of receiving sets. They concentrate attention on an instrument on the dash board. Before you know it you are in the midst of it. It is rather terrifying this hurtling through a damp atmosphere, the visual consistency of which is like pea soup. The earth is lost to sight. A soft glow penetrates the fog. It is the lights of a city. This fades as the ship climbs.

Flying is now by instrument. The bubble in the levels tells the tale of an even keel. Pilot and relief receive in their ears a din of dots and dashes from radio beacons on either side of the airway. Too many dots—too far to the right. Too many dashes—too far to the left. A slender reed vibrates in the instrument on the dash. This is similarly operated and serves as a check.

Another radio message comes forward. Clear weather at the airport. You emerge from the fog as suddenly as you plunged into it. Ahead lies an area dotted with the red, white and green lights of some apparent holiday celebration. A slender shaft of white light shoots aloft and making contact outlines a patch of the under side of the clouds. This gives the pilot his ceiling. An illuminated wind cone gives him his wind direction. A series of flashes from three lights hung in a row above the control tower —the airport beacon—is his landing signal.

The ship responds with three flashes of the riding lights and swings in a circle around the port into the wind. Then comes the blare of illumination from the floodlights and projectors set in the corners of the field. Terrain, hangars, mooring mast and obstructions stand out in sharp outline. The ship goes over the "hump." The roar of the motors subsides to a flutter. There is a bump and a rumble and you step out on the ground.

Apart from the airport, the establishment, maintenance and operation of all these facilities is done by the Airways Division. Much gratifying work has been done. Much more remains to be done. At the present time there are about 12,000 miles of airways in the country equipped or under construction for night flying. Familiarity with these aerial paths of commerce is as necessary to a pilot as his ability to pull his ship out of a spin. Thus he must have maps. The Airway Mapping Division, operating in conjunction with the Coast and Geodetic Survey, provides him with these. They are called "strip-flight maps" and give him a detailed picture of the terrain with distances, courses and the aids to air navigation on the airway. A successful start has been made on a program of forty-two such maps.

The Aeronautical Research Division operates in conjunction with the Bureau of Standards. Here have been developed the radio beacons operating both aurally and visually, which assist pilots to fly a true course in bad weather. Considerable work has been done with radio telephony which will go a long way toward enabling aircraft to gain the upper hand of its worst enemy—fog. Particular attention is being given to the development of

(*Continued on next page*)

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(Continued from preceding page)

fog-piercing lights. Even the diminution of noise from motors has come in for investigation. This division is a center of vigilant resource in experimentation.

Last but not least comes the Air Information Division. Here is gathered all the information touching the activities of the other divisions. This data is compiled and analyzed and then published in the form of pamphlets. These the industry and others interested may have upon application. Accurate records and statistics, which reflect the development of the industry in all of its phases, are also kept as a basis for future calculations with respect to air commerce. This is a very vital aspect of the operation of the Act. Here is concentrated the last word on commercial flying conditions throughout the country for the benefit of all concerned.

There are still other sections of the Act which have the effect of tying up existing governmental agencies with air commerce. For instance, the President may set apart air-space reservations. The power is reserved in the Secretary of War to designate military airways. Ports of entry are to be designated by the Secretary of the Treasury for foreign civil aircraft carrying merchandise, and similar provision with respect to aliens is placed under the supervision of the Secretary of Labor. These two latter provisions functioned upon the arrival of the *Graf Zeppelin* at Lakehurst.

It is the duty of the Chief of the Weather Bureau under the supervision of the Secretary of Agriculture to furnish data in aid of air navigation. Government owned air navigation facilities may be made available for the use of the public, and in the event of an emergency, they may provide for the servicing of private and commercial aircraft. Provision is made for reciprocal privileges to cover the case of foreign aircraft and airmen. Pursuant to this there is in effect at the present time an agreement between Canada and the United States.

The Air Commerce Act is a carefully constructed statute. Those of its provisions which are aimed at encouragement bring to focus in the office of the Secretary of Commerce the active aid of several departments of the Federal Government. Equipped with adequate appropriations and skilfully administered, these provisions can be and are of invaluable assistance to a fast developing industry. In like manner the regulatory sections are centered in the same official. Their effective administration and enforcement is now having the very salutary effect of uniformity of requirements without which commerce by air would have a haphazard development. They have the further effect of setting and maintaining a high standard for materiel, personnel and operation upon which the traveling public may safely rely.

The Act has entered upon the fourth year of its existence. There is no question but that it is functioning smoothly and efficiently. It is against this legislative background that the bold strokes set in motion by Colonel Lindbergh's flights have been painted into the canvas that at the present time comprises commercial aeronautics in this country. Without it those historic flights would have remained sporadic stunts as have so many in the past. True this statute has not yet passed muster before the courts. Entangled in its terms are many legal problems, obvious and hidden, the answers to which must await the determination of the courts. The whole problem is in a formative state and judicial action will be well worth the watching. Without doubt, in the main, the development by

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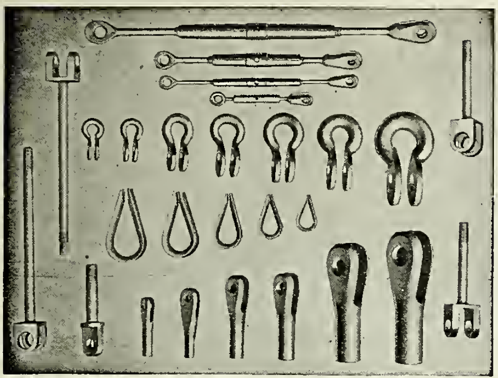

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adjudication of this new agency of human intercourse will follow the lines laid down in the past with respect to the existing arteries of the social and economic life in this country.

A sturdy foundation has been laid. The state of the art has progressed into a phase which requires regulation and with respect to which intelligent and far-sighted legislation has been safely initiated. It will not be long before the many fascinating and vexing problems as to the ownership of the air, questions of jurisdiction, the construction of the legislation already enacted, the dove-tailing of Federal and State authority and a host of other related issues will be before the courts. The adjudication of these questions, formulating as they will man's attempts to enforce his rules of human action to the uttermost human limits of the skies, are awaited with keen interest by lawyer and layman alike.

PUTTING THE REVS IN REVOLUTION

(Continued from page 52)

quarters of their time at the counter and the other quarter at the war. They said that after standing at the counter for a few hours they didn't mind the war so much. Neither did I.

And there was Fred Foster telling everyone about Naturaline and handing out fine leather pocket books. It's getting so now in this business that people give you things—they never used to. Tom Fagin was handing out silver pencils and begging everyone to write him and order a Scintilla Magneto.

One very odd sight was Captain H. C. Richardson trying to get inside the Great Lakes Trainer. He was quite a snug fit for it and bulged it a trifle. If you see one of those fine little planes with the sides swelled out you will know it is the one Capt. Richardson tested by sitting in it. A clever little plane, by the way.

Another astounding sight was Mr. Calvin Coolidge selling life insurance for the New York Life, which company was practically betting that nobody could get hurt in a Mexican revolution unless he tripped and fell under a mule. Cal was wearing that ten-gallon hat, and it was the first time I ever saw him get any good out of the thing. Cal needs a lot more than that hat to make him look like a cow-puncher. He doesn't look any more like a rancher than Al Smith did like an Indian in that head-dress he wore for campaign purposes. Hoover, you recall, wore his ordinary hat, and got elected.

Admiral Moffett was there, flying over the lines every day and trying to see the war. But those Mexican wars are hard to see from the air. The army usually is either sleeping or holding up a bank. And since they all carry their wives and children along, it's hard to pick out the army from an ordinary crowd of peons walking to town. The Admiral wired back for the Naval Intelligence Department to come down and help him, but it was on a vacation, as usual. The Admiral doesn't receive what you'd call enthusiastic support from anything but the Bureau of Aeronautics. They were all there, trying to get the sea-going part of the force to come down and look. Admiral Hughes said that he was in favor of all wars being fought inland, so the Navy couldn't get hit. This opinion was enthusiastically endorsed by the rest of the Navy that was riding the Subway back in New York.

Al Williams had his racer down there, still trying to get it to perform on floats. He was taxiing up and down the Gulf of Mexico until the water got hot under the

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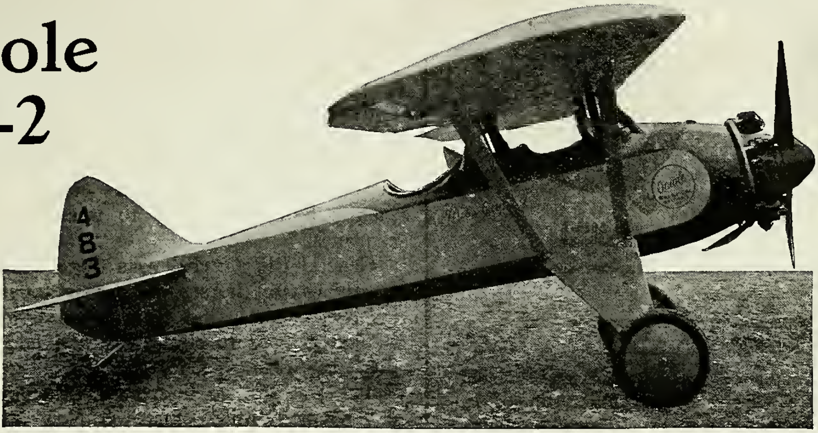

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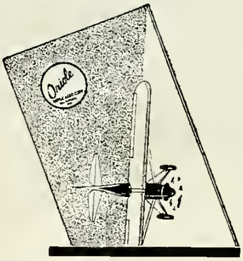

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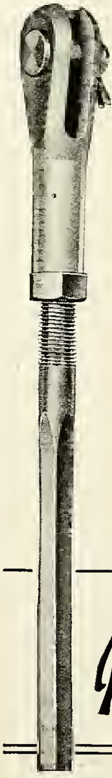

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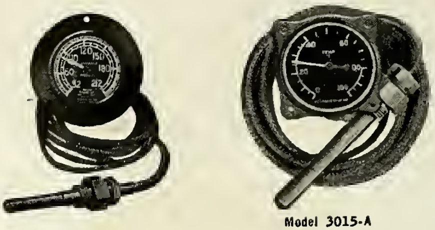

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(Continued from preceding page)

floats. And Renee Fonck—(have you forgotten him yet?) —he was there in the Sikorsky planning a flight over the Gulf. He had figured the Atlantic was too wide and the Gulf about right. He has sat in that plane so long, wondering whether or not to go somewhere, that he's worn the seat out of his lizard skin flying suit and is hunting for a new lizard to make repairs with. That boy looks as though he's more likely to wear out lizards than he is airplanes.

General Bill Mitchell was there with a squadron of his Virginia-raised horses, and Casey Jones was on hand with his trick vest, asking everyone to sign it for him. Tony Fokker offered to sign twice and add some real tone to the thing.

The war got so interesting—though nobody had been doing any fighting—that the New York *Times* stopped press-agenting the Byrd Expedition and ran the war on the front page. Poor old Russ Owen had to write his sick-dog and frigidaire tales on the inside pages. Deek Lyman was representing the *Times,* C. B. Allen the *World,* and Frank Walton the *Herald Tribune.* The only actual fight they ever reported in that war was one between two pilots who had taken too much tequila on top of a dish of Mexican jumping beans.

Meanwhile Congress got out an educational appropriation to send a flock of Admirals down to see a war, since they had completely missed the one in Europe. But inasmuch as the postmen don't deliver in the Subway the boys never got the checks, so they missed this one, too.

Ed Gott was down there with the Keystone Patrician, just in case the authorities wanted to move the whole war over into the next county. Ed said the Patrician could carry everyone who really wanted to do any fighting—that wouldn't have been such a big load, either.

Elliott Springs was there selling, or trying to sell Fort Mill non-skid colored sheets. He might have sold some, too, only the army had never heard of sheets. They didn't really need them, for they never bothered taking off their clothes. It was in Mexico that they first learned to do without buttons. They just get a new suit and sew it on and when it falls off in a year or two they get a new one and sew that on. Elliott says that no matter how slow the party is, Fort Mill colored sheets are always fast.

Howard Wehrle, formerly of the Wehrle Waterworks, Philadelphia, was selling the latest expression of the old master, Clyde Cessna. And Walter Beech was telling everyone that his distributors weren't worth a damn, or there wouldn't be any planes there but Travel Airs. It just seems to pain old Walter when he sees anything but a Travel Air in the air.

When Casey got his vest all endorsed he spent the rest of his time trying to organize the war into a stock company. Casey was getting along all right, when along came the Aviation Corporation and simply bought the war as a sight-seeing proposition, which is about what it was, anyway. When they did that, Universal Airlines, Boeing, N. A. T., Colonial, and Western Air ran excursions to the thing. But most of the time they couldn't find it. Still, they did their best, and would fly over the country, pointing out groups of sleeping Mexicans, and say, "There's the war. Ain't it nice and quiet and peaceful? We hope you like it." When these excursions came down, only half the passengers were payload. The rest were members of the industry and the press, Godunking rides. All the reporters rode free, and kicked because

(Continued on next page)

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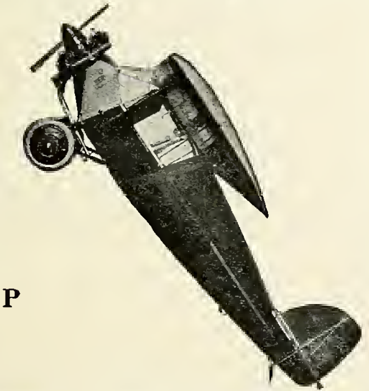

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(Continued from preceding page)

there wasn't a lunch included. But they really had a kick coming, because they had to listen to manufacturers telling stories of the hundreds of airplanes they had sold. It's wearing work to listen to a manufacturer give his imagination free play.

Captain Monte was really busy. He stayed awake day and night, chasing former Postmaster Gen. Harry New to see that he didn't give any mail contracts to the rebels. He certainly had the Gen. on the run. Some others who seemed pretty busy were George Haldemann and Art Goebel and Lee Shoenhair. They had the best looking girls rounded up as usual, discussing philosophy or theology or something.

Amelia Earhart was writing sob stuff for *Cosmopolitan,* Elinor Smith was trying for another endurance record, and Lady Heath was looking for someone to carry her trunk. I missed my little friend Ruth Elder. I believe she's gone Hoot Gibson. She'll probably graduate to cowponies in her next fillum. Backseat Bessie Davis had navigated George Weiss down to the war—he'd never have got there without her—she said so herself. She and Charlie Colvin were supplying instruments to the rebels, while Ken Gundlach of Consolidated was selling the federals all they'd pay for. Most of their men couldn't read, but the instruments looked very nice and added tone to the ship. Those instruments lasted longer than the planes, at that. Four new planes were delivered to the federals one day—and next day there were two—and the next there was one—and soon there were none. But the instruments made pleasant souvenirs. The Mexican average for the war was one pilot, one airplane, one flight, one crash. But it was just good fun, you know.

Messrs. Hokum and Hooey, guiding lights of the Quiet Birdmen, were busy selling pins, and Miss Levy was keeping track of the money. They did quite a business, as the senoritas collected them as souvenirs.

This war I've been describing dragged along, with generals sleeping here and there, and it might have been going yet, only the Quiet Birdmen held one of their meetings. And when the two armies looked in on that meeting about 3 a. m., they got so discouraged when they compared it to the fighting they had been doing that they simply took to fighting the hills and called off their own war. They just moved away from there for fear the Q. B.'s should finish their own little entertainment and go out to clean up both armies at once. They could have done it, too.

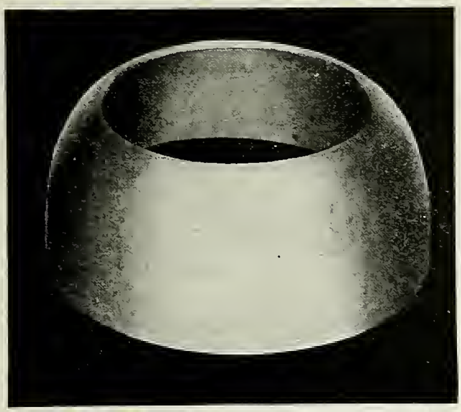
The merriment was right at its height, and the armies had beat it, and all of Mexico was one loud shout—even louder than George's Restaurant in New York or the Ambassador in Los Angeles when I felt someone shaking me and a gentle voice, rather sweet yet commanding, was saying, "Wake up, dear. Wake up!" And I thought it was one of the senoritas; only it wasn't. It was Senora Caldwell herself, in person, not a movietone—and I was back in my little apartment on the shores of Lake Erie, slowly awaking.

"I've been to Mexico," I said, still half dazed. "In the revolution. And I've been so thirsty, walking around that desert. I'd like a drink."

"I'll get you one," said my little wife. She went to the frigidaire and brought me back a nice cold glass of milk. "So refreshing," she remarked.

"Yes, isn't it?" I shuddered. I wished I was back in Mexico.

N. A. C. A. COWLING



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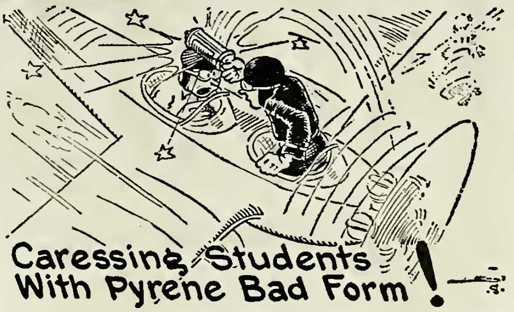
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WEATHER SERVICE AT AIRPORTS

(*Continued from page* 43)

"heavy rain," "sleet," etc. This first word in the report tells the pilot at once whether the conditions are satisfactory, impossible or simply uncertain and therefore subject to further study.

The next two items, ceiling and visibility, usually answer this question of uncertainty. For observations of ceiling at night the so-called ceiling light is in general use. Although it serves a meteorological purpose, it forms a part of the lighting equipment developed by the Airways Division of the Department of Commerce. Its use makes possible the determination of ceiling quite accurately up to 1,000 feet and fairly accurately up to 2,000 feet.

For observations of ceiling in the daytime it has been general practice thus far to make an estimate based upon the appearance of the clouds and the known height characteristics of different types. This method is admittedly crude, although fortunately it is most nearly accurate when the information is most needed, that is, when the clouds are low. At airport stations where pilot balloons are used, the ceiling can be determined with them, but their frequent use is expensive. It is gratifying to be able to state that within the last month or so tests with very small toy balloons have demonstrated that their rate of ascent for the same free lift is very uniform. Action has therefore been taken to supply the airport stations with these balloons. A watch, preferably a stop watch, and a tank of hydrogen complete the outfit. The entire observation can be made in five or six minutes, assuming that the ceiling is not above 2,000 feet. When it is higher than that, the information is not very essential, except occasionally in mountain sections.

Observations of visibility are non-instrumental. It is customary to give the greatest distance at which conspicuous objects can be clearly seen. Lights are used at night. This method is approximate only, although, as in the case of ceiling, it is most nearly accurate when the information is of most moment. Some attempts have been made to devise a visibility meter, but thus far none of these has met with success.

It is to be noted that observations of visibility show conditions in the horizontal, not in the vertical. No attempt is made to measure the latter, although it is given indirectly in the report of ceiling.

Wind direction and velocity, temperature, dewpoint and barometric pressure are all observed by means of well known instruments which need no description. In cities already having a Weather Bureau Office down town the equipment at the airport station is usually less elaborate. For example, there is little need for complete automatic records, since these serve statistical purposes mainly and are provided by the city office. As a rule, therefore, the instruments at the airport are of the indicating type and require little attention, at the same time giving very accurate information. Exceptions are the barograph and hygrograph which provide continuous records of air pressure and humidity, respectively.

Miscellaneous phenomena are observed directly, without instruments. They include thunder storms, line squalls, exceptionally heavy rain or snow, ice formation as reported by incoming pilots and any other conditions a knowledge of which is useful and at times vital in determining whether or not flights should be made. The airport station's personnel should pay special attention to this part of the reports.

(*Continued on next page*)

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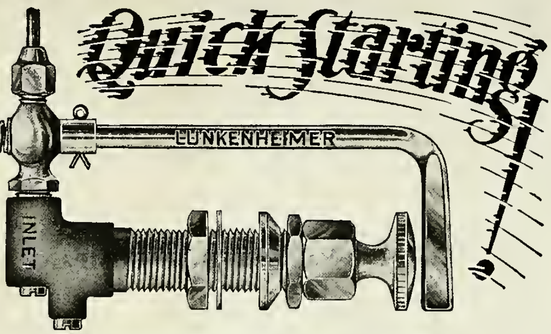

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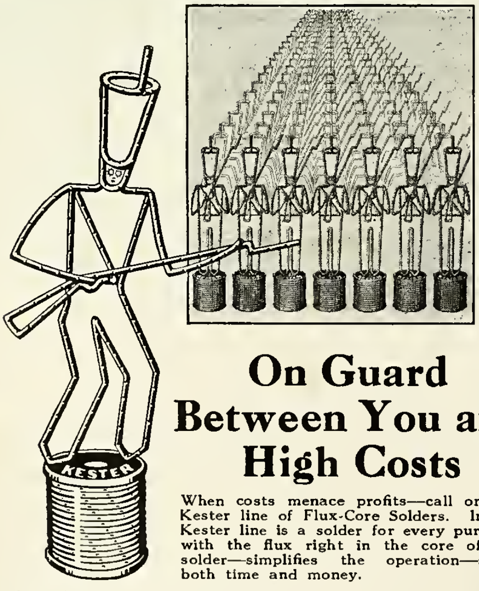

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(*Continued from preceding page*)

For measurements of upper wind direction and velocity, so-called pilot balloons are in general use at airports. These balloons are about six inches in diameter and are made of pure rubber. Different colors are employed to give the best possible visibility against varying backgrounds of sky and cloud. The balloons, when filled with hydrogen, are about 28 to 30 inches in diameter and ascend at an approximately uniform rate of 600 feet per minute. They are followed with a theodolite, and angular readings are made each minute. By means of slide rule, portable telephone and plotting board, computations are made while the observation is in progress with the result that the wind conditions at various levels are known in detail within two or three minutes after the balloon disappears. For observations at night a small lantern is suspended a few feet below the balloon.

The one weakness of the balloon method is that its use is limited to the levels beneath the clouds. Kites do not have this handicap and are used by the Weather Bureau at some places, but not at airports because of the hazard that the wire or cable would offer to aircraft. The development of suitable and not too costly methods for upper air observation, including temperature and humidity as well as wind in cloudy weather, constitutes a problem that must be met and solved. The data would be of incalculable value not only in determining wind drift but also in forecasting ice formation and other unfavorable conditions.

Briefly summarizing, the equipment at airport stations should include, as a minimum, the following:

Anemometer (Robinson 3-cup type, with 1/60th mile and one-mile contacts); wind vane; support (18-foot, for anemometer and wind vane); indicator board (combined wind direction and velocity); two thermometers; thermometer shelter; psychrometer; two barometers (1 mercurial and 1 aneroid); barograph; hygrograph; theodolite; portable telephone set; and plotting board.

Balloons, hydrogen tanks, and miscellaneous material required for proper functioning of the instruments and apparatus above listed.

Communications. Even with quarters, personnel and equipment satisfactorily provided, the airport station will still be of little service unless it can get the information to distant points and in turn receive reports from those places. A prompt and dependable system of communications is the fourth and final, and in some respects the most important, link in the chain of service at an airport. The development and maintenance of such a system are functions of the Department of Commerce. Assuming that the system has been organized and is operating satisfactorily, let us consider briefly the main features of the weather service that is thus made possible.

At certain intervals the observer makes his instrumental and other observations, enters the data on a standard form and sends brief reports, by means of the communication system provided, to other points on the airway. This same communication system brings to him similar reports from those points, and these he posts on a large bulletin which is displayed in a conspicuous place in the office. In the early days of the service a black board was used for this purpose, but experience has shown that large sheets of paper, suitably ruled, are preferable, principally because two or more of them, containing successive reports, give a picture of the changing weather conditions. They are usually kept on file for a month or so and then destroyed.

The same data that are shown on these bulletins are also

(*Continued on next page*)

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STROUD

(*Continued from preceding page*)

in some cases entered on smaller forms called "Pilot's Weather Reports," and one of these is given to each pilot before he starts his flight.

The time interval between observations depends upon the volume of traffic. Wherever this is large, it is found that hourly reports from points along the airways, supplemented by less frequent reports from places some distance therefrom, are needed to provide the best possible service. At places where only a few flights are made daily, reports are furnished to suit the schedules. The former arrangement is being extended as the need develops and will eventually be in effect on all of the lighted airways.

In addition to the frequent reports that constitute the intensive service, the airport stations receive by telegraph the country-wide twice daily network of weather reports, and these are charted on the well-known daily weather maps, which are available for inspection and study by meteorologist and pilot alike. These include the upper wind reports which are entered on special charts. Finally, from the District Forecast Centers come the general weather forecasts and the special airways forecasts. The meteorologist makes use of all these reports and forecasts and at stated intervals along some of the more active airways he combines them in summarized statements and short period forecasts which are broadcast to planes in flight.

It can readily be seen that the communications system forms the keystone of the structure of weather service at airports. It matters not what the system so long as it is prompt and dependable. Without these qualities, the entire system breaks down completely. Delay is fatal,—more so in flying than perhaps in any other line of human activity.

We come now to the consideration of service required at a large percentage of airports that do not form a part of any of the major airways systems. By the terms of the Air Commerce Act, the Government is authorized to provide aids to civil airways except airports. This is interpreted to mean that municipal and private airports must furnish their own equipment, including lights and weather instruments. This interpretation is not in conflict with what has been said in the first part of this article. It is true that at airports on established airways the Weather Bureau supplies its own equipment, but it should be borne in mind that this equipment serves the airport as such only incidentally. Its chief purpose is to contribute to the service for the airways system as a whole. In such cases, therefore, the Bureau is justified in supplying the equipment in order to have it of standard type and its use and care under the Bureau's control.

The Airport Regulations issued by the Department of Commerce require that any airport in order to receive a Class A, B, C and D rating must be provided with weather instruments including a wind direction indicator, an anemometer, a barometer and a thermometer. There must also be a bulletin board and facilities for giving pilots the most recent information. These are the minimum requirements. Their cost is small, an insignificant part of the total outlay in purchasing and developing an airport. At such airports as can do so, and particularly at the larger airports, it would be well to make the equipment somewhat more complete, approximating if possible that heretofore described as standard for Weather Bureau airport stations. However, it is not believed essential to install a still more elaborate outfit for procuring automatic continuous records, unless trained personnel are employed to take care of them. Instruments of the indicating type are best suited for the

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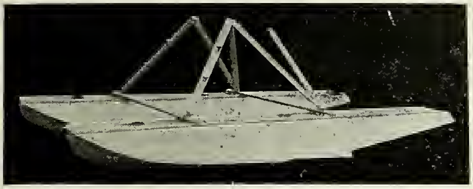

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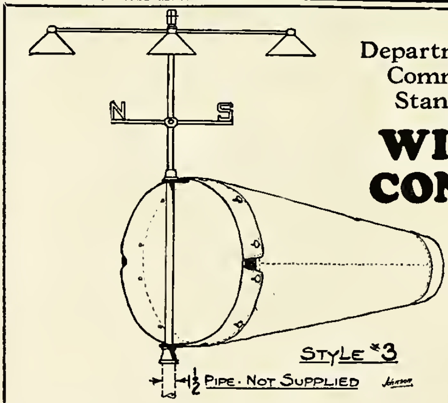

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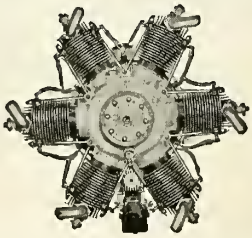

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(*Continued from preceding page*)

service most needed, that is, observations of current conditions, quickly and easily made.

The question of communications is perhaps the most perplexing one for airports that are not on an established airway. The service, in order to be of real value, must include some reports from other points and the cost of transmitting any large number of these amounts to a considerable sum. A partial solution at least is found in the installation of suitable radio receiving apparatus. By this means it is possible to pick up the country-wide reports that are regularly broadcast in code twice daily by the Weather Bureau. In addition to these, it should be possible to receive at least some of the bulletins that are broadcast by the Department of Commerce from certain control stations on the major airways. This system is at present in operation only on a portion of the transcontinental airway, but will undoubtedly be greatly extended within the next two or three years. Then, too, there are the forecasts, including those for flying activities, that are regularly broadcast in all of the larger cities.

These various sources of information should be supplemented by arrangements for receiving reports from selected places, principally those to and from which most flying is done. Such reports can be exchanged by telegraph or telephone, or by teletype if funds are available.

The matter of funds would also largely determine the type of personnel at these airports. For making the observations and for receiving and posting the reports from other places, no specially trained personnel is needed. However, at places where a more ambitious program is to be carried out, including the making of weather maps and local flying forecasts and the taking of upper air observations, only experienced and well qualified meteorologists should be employed. In general this would be unnecessary at airports in cities that already have a Weather Bureau station downtown. In such cases arrangements should be made for a copy of the Weather Map to be sent to the airport. All stations of the Bureau have instructions to do this, if requested, and to coöperate in other ways to the fullest possible extent.

So far as quarters are concerned, here again it is largely a matter of what funds are available and how extensive a program is laid out. It is well to bear in mind that many airports that are not now on established airways are almost certain to be on one or more of them later. When they are, weather service will probably be furnished at those airports by the Government. If quarters are already available, one of the main requirements is met, without the necessity of making alterations in existing buildings or of putting up a new one not originally planned for and therefore out of harmony with the general scheme. Those who are building airports might well consider the advisability of providing such quarters against the day when they will be used for service by the Government. Should that day never come, the money will not have been wasted, for the quarters can still be put to some other use.

Earlier in this paper it was stated that our conception of what constitutes adequate weather service at airports has undergone a very great change during the past three years. It is true that the fundamentals remain essentially the same as then, but the detail and intensiveness of the system as it exists on certain airways and as it is shortly to be extended to others bear little relation to the service with which we started in 1926. Few then would have dared to hope for such a development in so short a time.

(Paper presented at the Airport Convention, Cleveland, Ohio, May, 1929)

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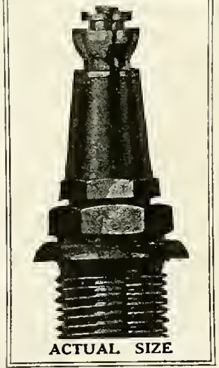

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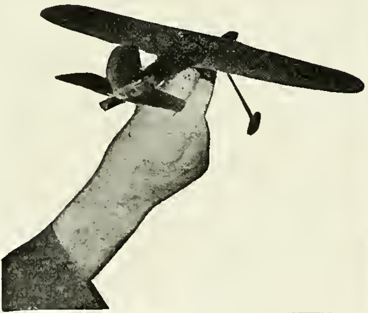

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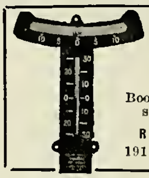

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FOR SALE: Anzani 3 cyl. 35 H.P. motor. All new bearings, new rings, valves reseated, 5 hours on test block. Complete with Zenith carburetor, Anzani Magneto, $395. J. F. MacDonald, Laurel, Montana.

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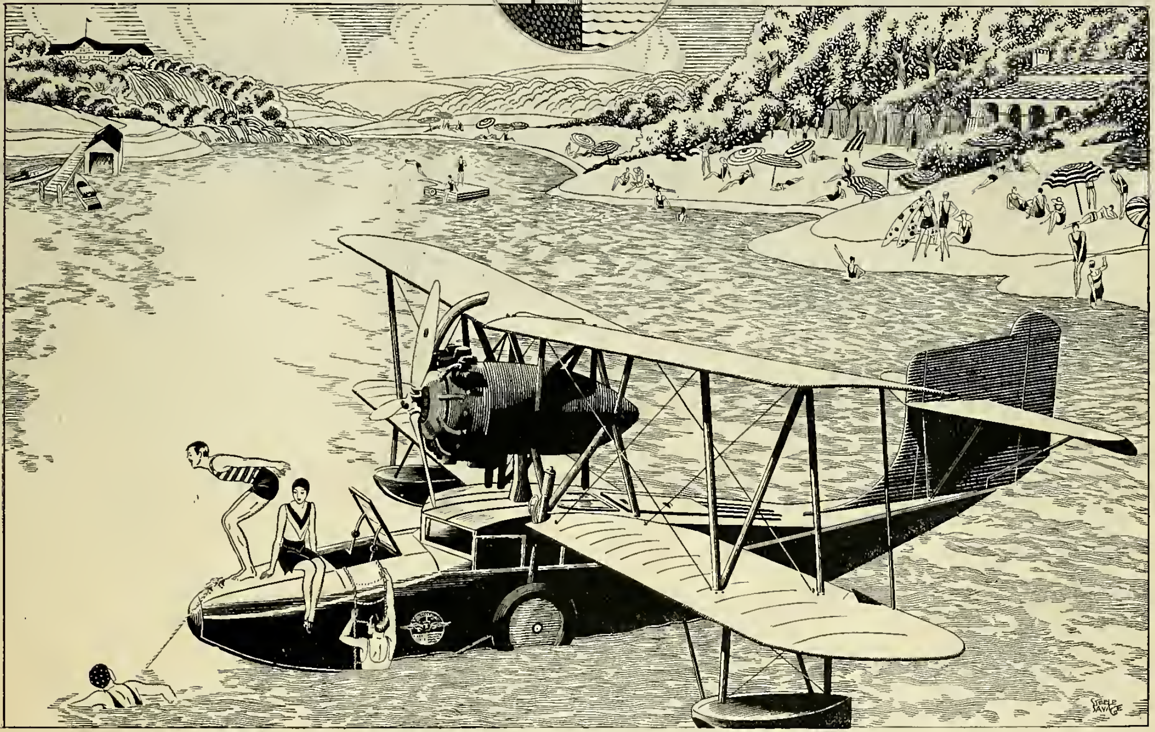

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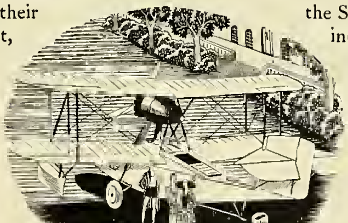

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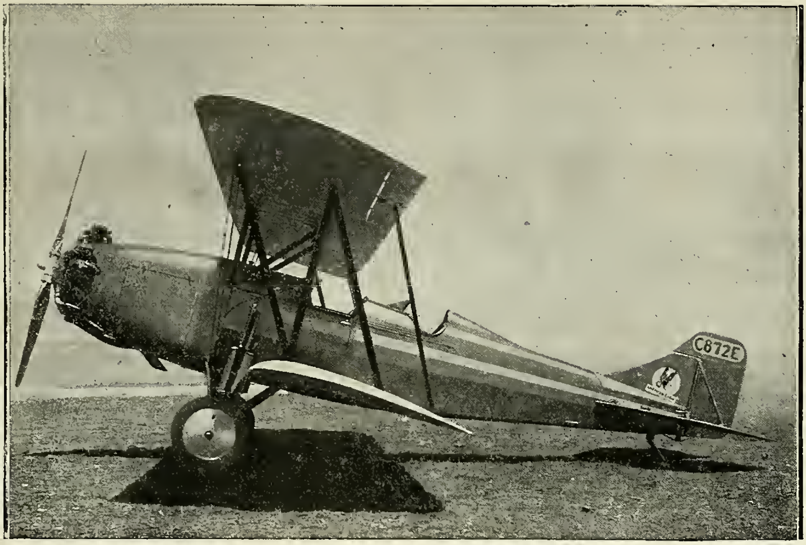

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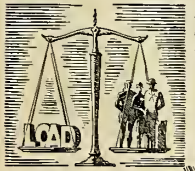

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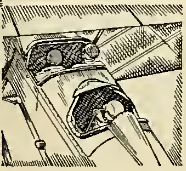

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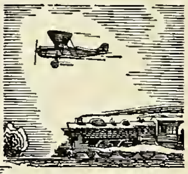

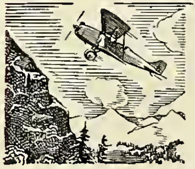

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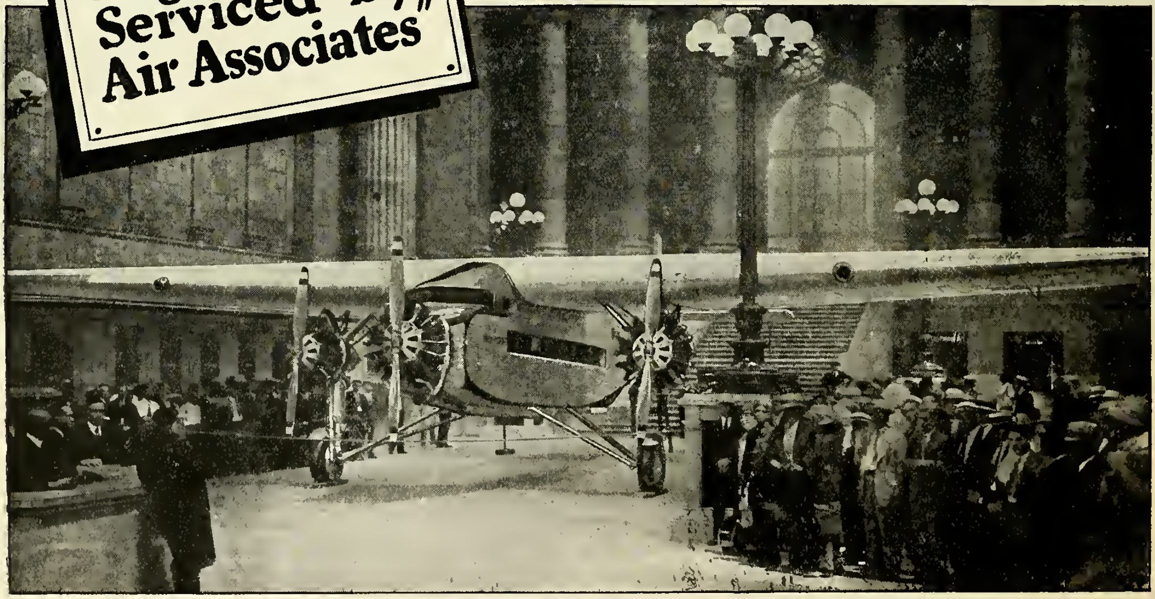

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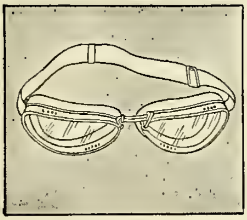

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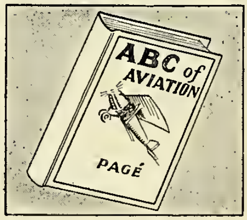

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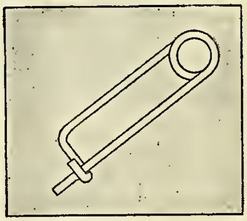

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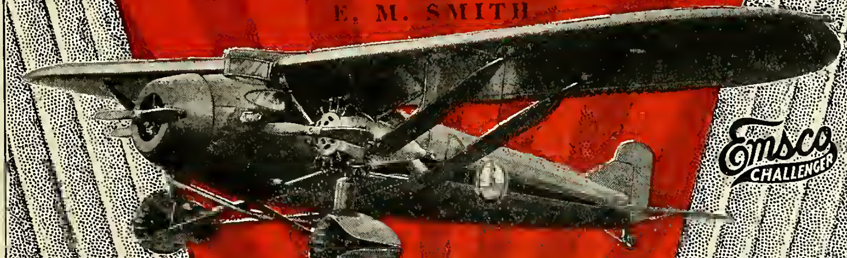

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The photo shows Lieutenant Hinton describing the flight of the NC-4, of which he was pilot, to the Prince of Wales. As a flier, Hinton ranks among the country's few. And as an instructor he represents a combination impossible to beat—long experience, painstaking study and a natural ability to make things clear to others.

Train Right at Home:

No need to pass up the opportunity of a lifetime just because you haven't the time or money for several weeks or months at a school. No need to close your eyes to the great money-making possibilities of this most fascinating of all industries, just because you're tied down to a job. For the important, essential, basic facts that form the foundation for real success in any branch of Aviation—whether you propose to climb the skies or keep both feet right on the ground—Hinton can give you quickly, thoroughly, and inexpensively—*right at home.*

10 to 40 Jobs on the Ground to One in the Air

Think of the high priced skilled workers needed—mechanics, electricians, welders, carpenters, pattern makers, draftsmen and a score of others—in the construction and servicing of a plane. Or consider the big money to be made by salesmen, instructors, demonstrators, private pilots, etc. In every corner of the land manufacturing, transport, air port, service and sales organizations are springing up. Thousands of them! And they all have valuable openings. But no matter what you do—what branch you take up—you must **FIRST** know the basic facts, the underlying principles, the "rules of the game."

Hinton Will Teach You About:

Types of planes, their construction and uses; motors, ignition systems, carburetion; instruments; theory of flight, navigation and countless other essential facts. He'll teach you how to talk Aviation in the Aviator's language. In clear, understandable words and with hundreds of pictures, charts and diagrams, he gives you the meat of experience covering years of study and thousands of miles of flight. Furthermore, his remarkable course is backed by his own personal advice and assistance. And then as his student you will get the FREE assistance of his Employment Bureau, which is placing men in real jobs at real pay right along.

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The coupon at the right will bring your copy of Hinton's new, FREE book, "Wings of Opportunity." From its interesting pages, you'll learn just how Hinton trains you, where your opportunities in Aviation are; what you must do to take advantage of them in the quickest possible time and at the least expense. If you are 18 years of age or older clip the handy coupon.

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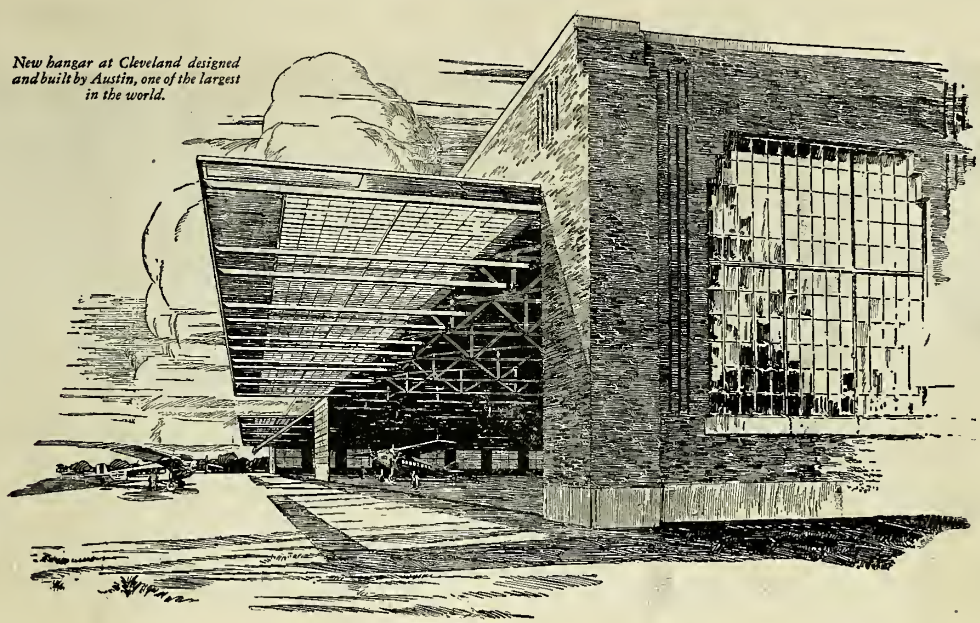

New hangar at Cleveland designed and built by Austin, one of the largest in the world.

At the Air Races and Show, *see Austin*

CLEVELAND this month will be the hub of aviation activities, when the National Air Races and Aeronautical Exposition are held, bringing thousands of visitors from all over the continent.

The municipal airport has been further improved to the extent of hundreds of thousands of dollars in preparation for these events. Cleveland has often been cited for its splendid hangars, five of which have been built by Austin, four from Austin designs. The largest, being completed just in time for the Races, of cantilever design, has a 200 ft. clear door opening and is 120 ft. deep. Special cantilever doors of Austin design, motor operated, are a unique feature of this hangar.

An interesting airport exhibit will be shown by Austin Engineers at the Exposition building, suggesting in a small way the service which has been rendered in 37 cities from Coast to Coast where this organization has designed and built complete airports, hangars or aircraft plants.

One of the most recent projects undertaken by this organization is the design and construction of a new airport in California for large western interests. Other recent contracts include layout and design for the municipal airport at Omaha, a combination factory and hangar for Moreland Aircraft Company, two new hangars for Scenic Airways at Phoenix and El Paso, and hangars at Tulsa Airport for Spartan Aircraft Company and S. A. F. E. Way Lines. Spartan's new factory was also designed and built by Austin.

For information on any type of airport project or aviation building, see Austin at Cleveland. Or phone the nearest office, wire or send the memo below.

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Airport Engineers and Builders • Cleveland

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The Austin Company of Texas: Dallas The Austin Company of Canada, Limited

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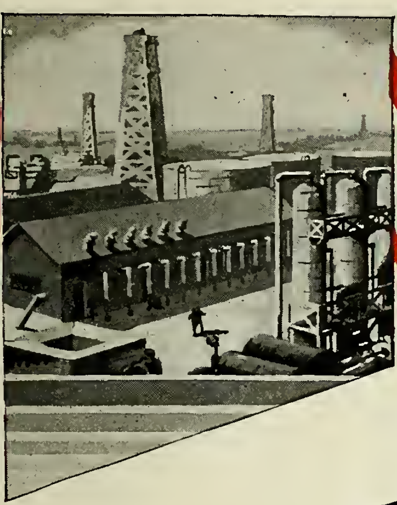

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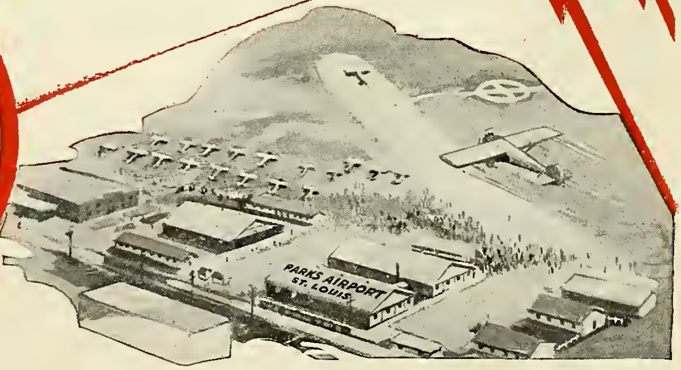

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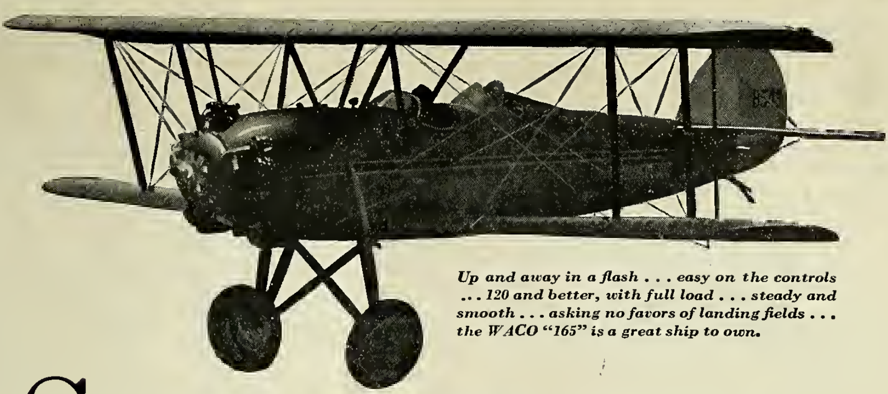

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Let us send you the new booklet that gives facts and figures about the WACO "165." And if you wish, we shall be glad to refer you to the nearest one of the nearly 300 WACO dealers.

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J-6 Wright "Whirlwind" motor (165 H. P.—5-cylinder) . . . Bendix brakes . . . Navigating equipment . . . 65-gallon gas tank . . . 3-place . . . Dual controls . . . Customer's choice of colors $6370

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It is a fact that the unusual and exclusive wing design of the Davis V-3 Monoplane achieves a degree of inherent stability—even in rough weather—far beyond previous light plane experience.

It is a *modern* plane *in every detail*—so soundly engineered, and so sturdily constructed that operating and maintenance costs are reduced to the minimum.

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DAVIS V3 MONOPLANE

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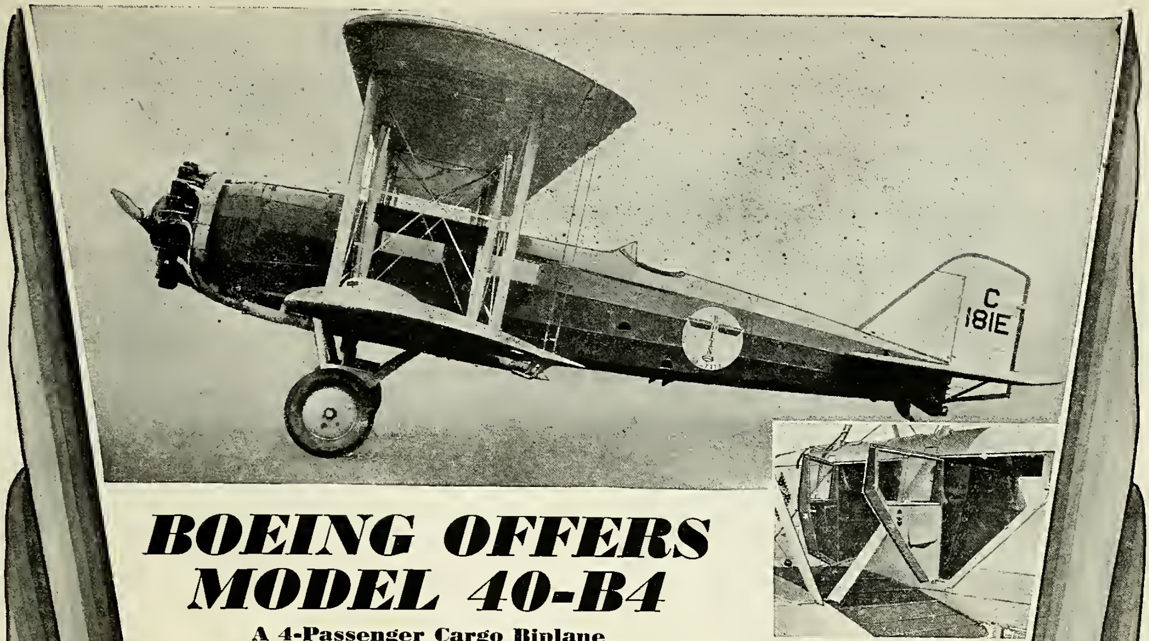
Service Ceiling	10,000 feet
High Speed	95 M. P. H.
Landing Speed	38 M. P. H.
Cruising Speed	80 M. P. H.
Climb	700 ft. per minute
Fuel Consumption at Cruising Speed	1½ gals. per hour
Cruising Range	350-400 miles

A TWO-PLACE HIGH-WING MONOPLANE—"THE AMERICAN MOTH"



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THIS outstanding plane from the largest airplane factory in America meets the demand for a *speedy combination four-passenger cargo plane* required by transport companies and by corporations and individuals in the increasing diversity of civil flying. Its excellent performance at sea level or 12,000 feet, in sub-zero or tropical temperatures, has been demonstrated in 5¾ million miles flown by Boeing System in two years and in operation of other companies.

Model 40-B4 is the efficient, economical "seven day a week" plane for many purposes, including:

Air mail-passenger routes, transporting company executives, routing salesmen, sales demonstrations, flying merchandise to branch houses *{Model 40-B4 can be quickly changed to an exclusive cargo carrier with 1400 pounds pay load}*; emergency shipments, newspapers, oil companies *{Standard, Associated and Empire Oil Companies fly Boeing planes}*, advertising purposes, moving men and commodities to places inaccessible by rail, etc., etc.

Model 40-B4 is of superior design and typical Boeing *quality* construction. Welded steel body construction. Metal-lined cabins are sound-proofed. Deeply upholstered, comfortable seats. Forced heating and ventilation. Special night flying equipment. A 525 h. p. Hornet gives ample reserve power.

These are just a few of the distinctive features of this Boeing model, which is *in use on five pioneer air transport lines and by private concerns.*

You are invited to write telling us your requirements. Full details of this and other models (see specifications below) will be supplied.

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Boeing Offers the Following Models for Early Delivery

{All performance figures, based on maximum payload, are guaranteed, not estimated}

Write for catalog on various models.	**"40-B4"** Mail, cargo, 4-pass. and pilot, cabin biplane	**"40-B2"** Mail, cargo, 2-pass. and pilot, cabin biplane	**"95"** High speed, large capacity, mail, cargo, biplane	**"100"** High speed, single seater land sport biplane	**"204"** Four pass. and pilot, cabin flying boat
Empty	3722 lbs.	3543 lbs.	3196 lbs.	1871 lbs.	3358 lbs.
Pay load	1253 lbs.	1436 lbs.	1600 lbs.	23 lbs.	913 lbs.
Useful load	2353 lbs.	2536 lbs.	2644 lbs.	829 lbs.	1642 lbs
High speed	132 mph	132 mph	142 mph	165 mph	115 mph
Cruising speed	105 mph	105 mph	125 mph	140 mph	90 mph
Landing speed	57 mph	57 mph	56 mph	56 mph	59 mph
Engine	Hornet	Hornet	Hornet	Wasp	Wasp
Rate of climb (min.)	800 ft.	800 ft.	950 ft.	2,400 ft.	1,000 ft.
Service ceiling	15,100 ft.	15,100 ft.	16,000 ft.	24,000 ft.	12,000 ft.
Take-off run	550 ft.	550 ft.	540 ft.	100 ft.	900 ft.
Cruising range	500 mi.	500 mi.	650 mi.	525 mi.	450 mi.

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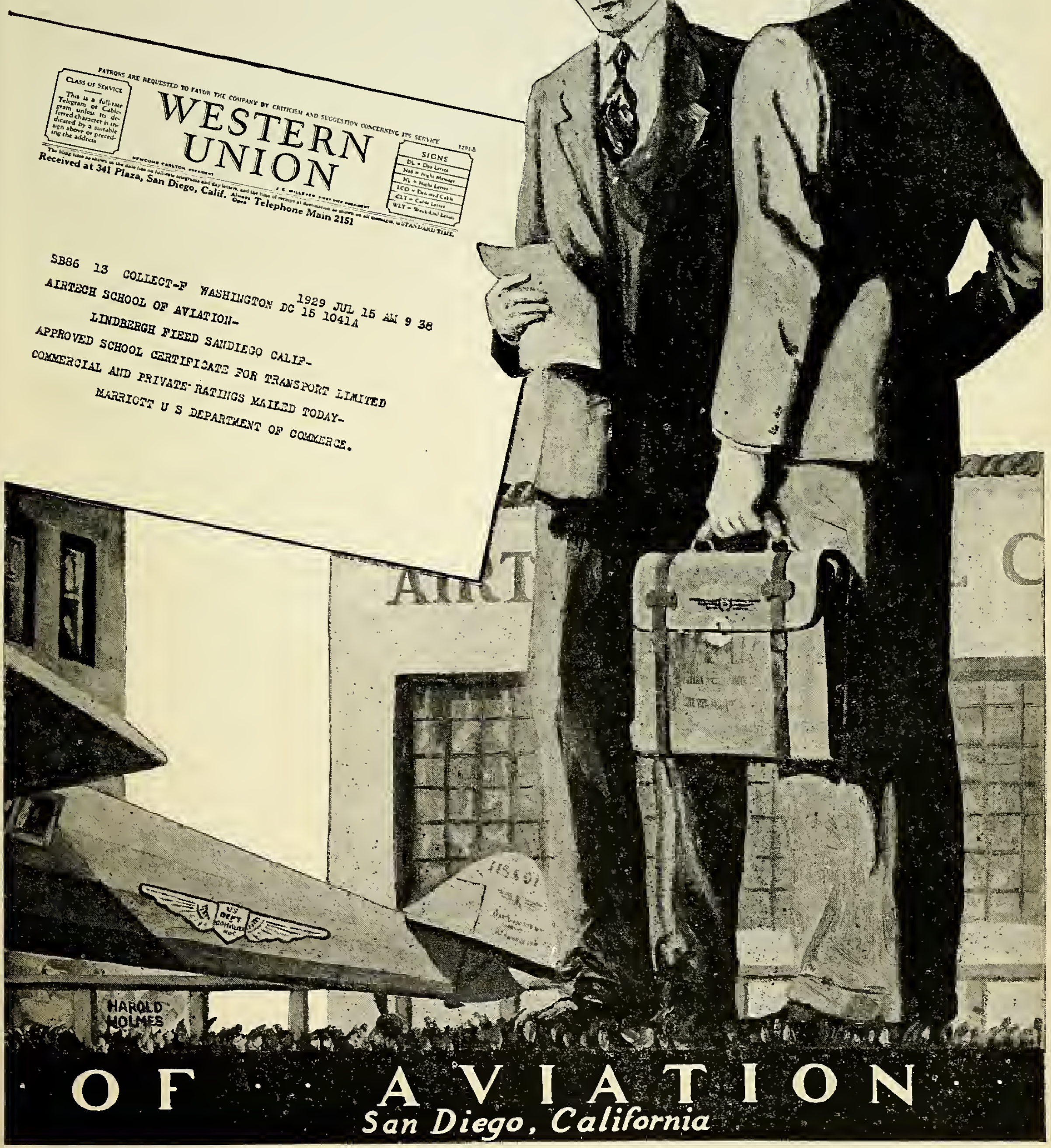

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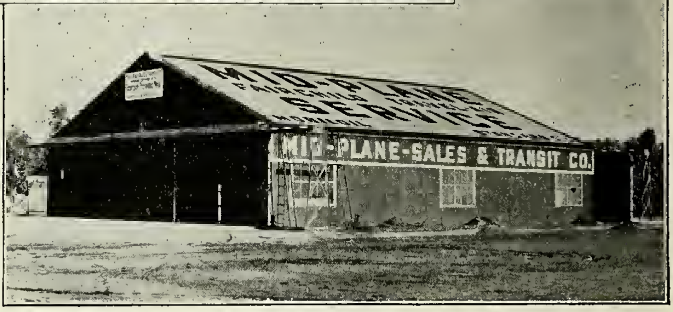

That was the record established in constructing this hangar for the Mid-Plane Sales and Transit Company at Minneapolis. What we have done for others, we can do for you.

Every sheet of the Robertson Protected Metal roofing and siding (*) for that hangar was cut to fit before it left the factory. And with the material went a plain, simple erection diagram which showed exactly where each piece was to go. Erection of the sheets was simplicity itself. No cutting and no fitting to do.

The Robertson engineers are prepared to submit blueprints for your hangar, or to follow your blueprints. We can also supply specifications for the structural steel work, suggestions for the types of doors, recommendations as to how much glass to put in, and where to put it; what to do about motor exhaust fumes and similar problems.

Robertson engineers have been working with hangars, both military and commercial, since the early experimental days in aviation, and they are glad to help you with any hangar problem you may have.

Yet truly

PERMANENT

This hangar, originally erected in France almost 12 years ago, is now serving in the Canal Zane

See our exhibit at the National Aeronautic Exposition, Booths 52 and 53, at Cleveland, Ohio, August 24 to September 2, 1929.

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(*) Robertson Protected Metal is an ideal material for hangars. Much less costly than "heavy construction," much longer-lived than unprotected metal roofing and siding—a happy medium between the two. The U. S Government alone has used over 7,000,000 sq. feet of it in 7 years. Write for description of it.

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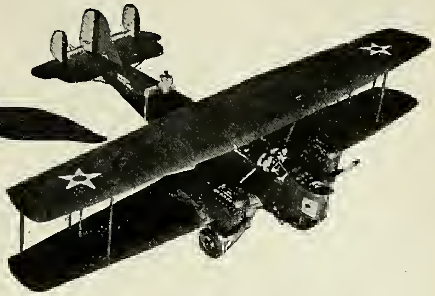

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Ask yourself this question: What will the aviation industry amount to in a year or so? And you know the answer—it will be America's most gigantic industry.

And question number two: Isn't it logical to assume that the men who get into aviation now will grow with the industry and be among the leaders "tomorrow?" We all know that to be so.

Even today, though aviation is still in its infancy, there is a big demand for pilots, for men in aviation factories—air transport companies—passenger and express service—air mail—barnstorming—aerial photography, motion picture work, crop dusting, etc. Opportunity! Fellows, aviation teems with it. Reason it out for yourself: thousands of passengers and tons of mail and freight are now being swiftly and safely carried all over the country daily. Manufacturers are all behind in supplying the demand for airplanes. Why? Because there are not enough men ready to step in and function in the various branches of the industry.

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Commander Byrd's "Fairchild" planes are necessarily built of hardy materials, among which is ARMCO Ingot Iron, used for the exhaust pipes. Although this pure iron was chosen primarily for its pronounced corrosion resistance, its workability and weldability were important factors.

From exhaust pipe to hangar covering

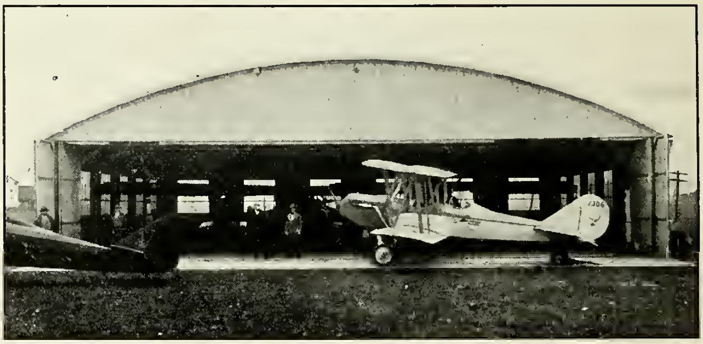
dependable protection

THERE are many places in airplane construction and housing where ARMCO Ingot Iron insures long, dependable service.

The exhaust pipe does its duty reliably throughout the life of the motor. For ARMCO Ingot Iron, virtually free from rust-promoting impurities, resists long the injurious gases which soon pit and destroy ordinary metals.

Fuel tanks function long and dependably when made of durable ARMCO Ingot Iron. Several planes that made aeronautical history were equipped with ARMCO Ingot Iron fuel tanks—chosen not on faith but on proved dependability.

Hangar covering has long been an important use for ARMCO Ingot Iron. The elements may assail, lightning and fire attack, rust and corrosion besiege, but this sturdy weather protection long shields the precious planes and dirigibles beneath.



This modern type hangar, which has a capacity of four planes, will long serve the Springfield (Ohio) Municipal Airport. Both the sides and roof are covered with galvanized ARMCO Ingot Iron sheathing. Designed and fabricated by the International Derrick & Equipment Company, Columbus, Ohio.

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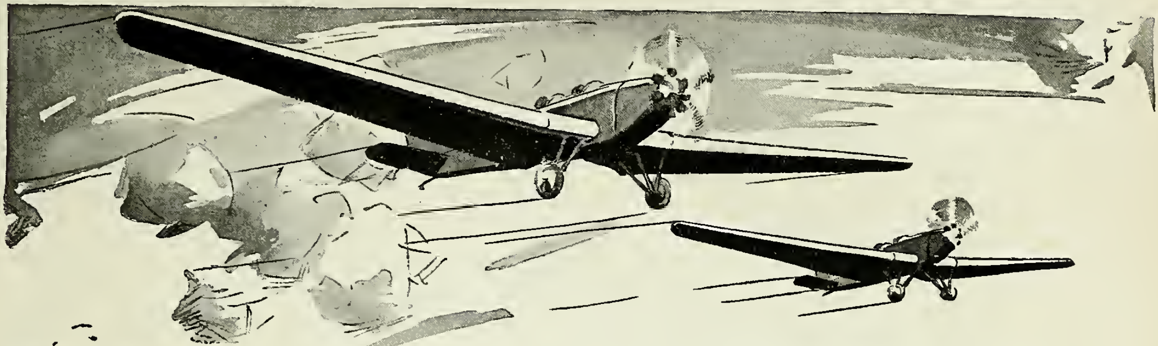


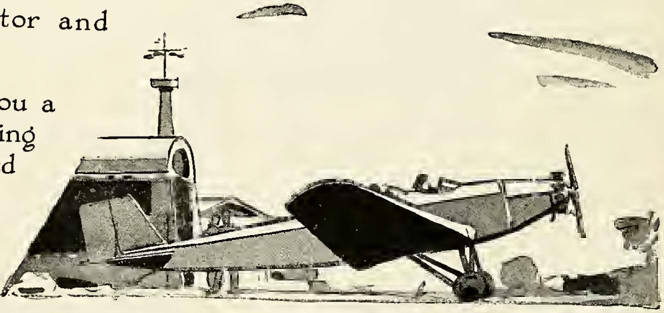
WATCHFUL economy is imperative at present flying school rates. A 30% saving in hourly flying costs may easily insure the financial success of your school. Even though you have full equipment, there are money-making reasons why you should consider making the Aeromarine Klemm AKL-25 *standard* on your field.

For, with its unheard-of economy of operation (30% below that of the average training plane), go all the superior qualities of one of the world's most popular and successful light planes for training and for sport flying.

Born as a glider—the AKL-25 flies itself. Powered by the famous Salmson 40-50 horse-power radial air-cooled engine, its dependability is a by-word.

Built to the requirements of the flying field, it will stand up under the roughest handling. And the AKL-25 is supreme in performance—instantly popular with instructor and student-flier alike.

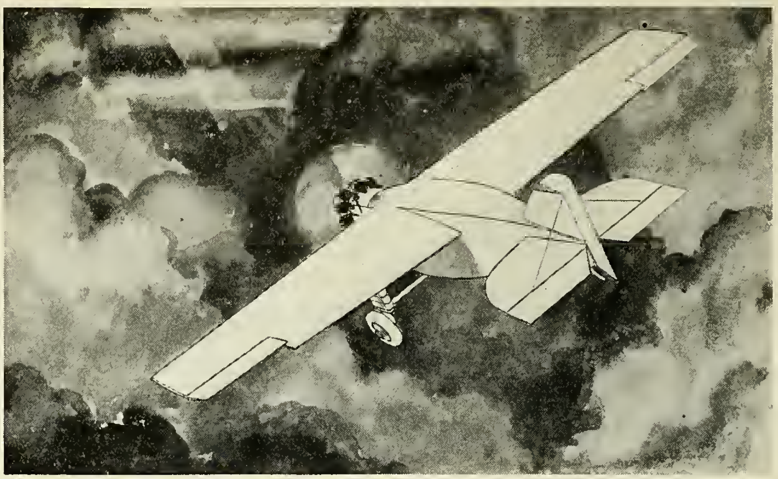
If your school is not netting you a handsome profit—write us regarding operating costs in the air. Increased production costs enable us to make prompt delivery. *Dept. of Commerce Approved Type Certificate No. 121.*



AEROMARINE KLEMM CORPORATION

PARAMOUNT BLDG. · 44th STREET AND BROADWAY · NEW YORK CITY

EXHIBITOR—NATIONAL AERONAUTICAL EXPOSITION—CLEVELAND—August 24th to September 2nd, 1929



LOST!

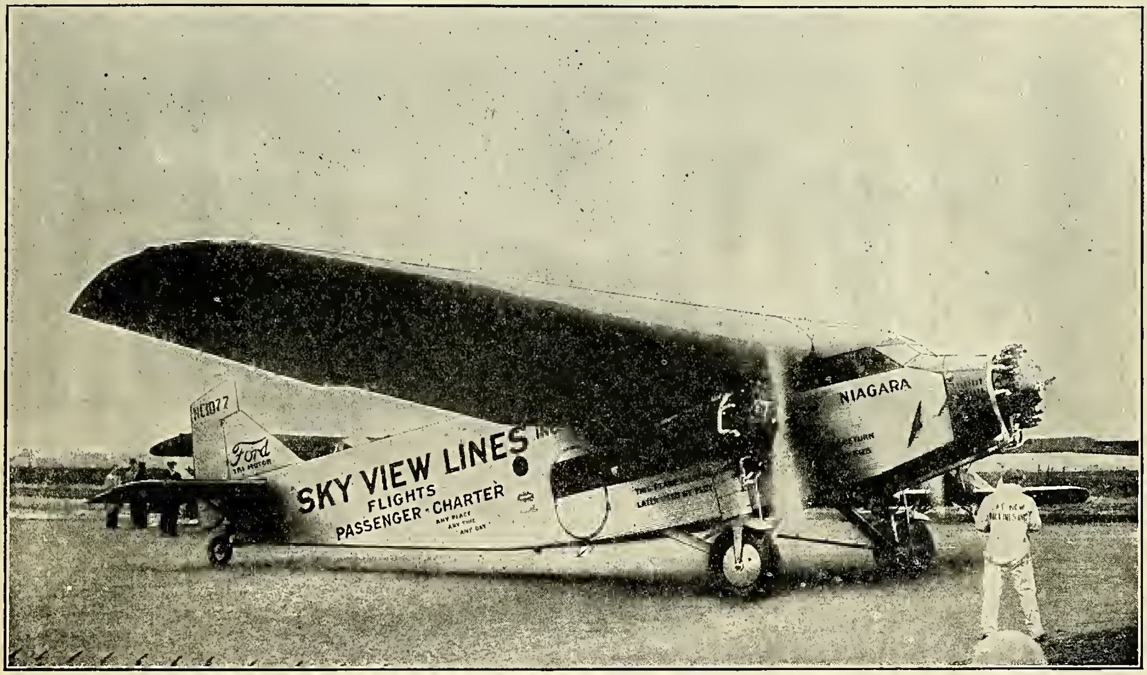
THAT'S WHEN A PILOT REALIZES HOW MUCH HE NEEDS AN ELGIN COMPASS

E 6 3 N
ELGIN NAT'L WATCH CO U.S.A.
AVIGO
COMPASS CORRECTION
COMPASS NO.
SHIP NO.
N E S W N
FOR 0 30 60 90 120 150 180 210 240 270 300 330 360
STR

Maybe you've been lucky. But if you've ever found yourself with overcast skies above and bad country below, gas running low, no sign posts to point the way, no place to land and get your bearings . . . that's when an ELGIN Compass is just about worth its weight in gold. As a matter of fact you don't need to pay that much . . . for they're most reasonably priced. Absolutely dependable. Easily compensated for magnetic attraction. Simple to install. The markings are large and clear . . . easy to read. Light, compact, and sturdy. Why not put an ELGIN on your instrument board before your next hop?

ELGIN NATIONAL WATCH COMPANY

AIRCRAFT INSTRUMENT DIVISION, ELGIN, ILL.
CENTRAL DISTRIBUTORS—JOHNSON AIRPLANE & SUPPLY CO., DAYTON, OHIO



"Niagara," the Ford tri-motor plane operated by Sky View Lines, Inc. of Buffalo about to take off for a flight above Niagara Falls.

NIAGARA SIGHTSEEING PLANES ARE FUELED WITH SOCONY

THE PLANES operated from the Buffalo and Niagara Falls airports by Sky View Lines, Inc., are using Socony Aviation Gasoline and Socony Aircraft Oil.

Scheduled day and night sightseeing flights over the Niagara Frontier, Niagara Falls, and the Gorge are made in perfect comfort by these air liners, powered with Socony Aviation Gasoline.

Like many other air lines in New York and New England, Sky View Lines, Inc., find that Socony products keep their planes running perfectly at all times.

SOCONY
REG. U. S. PAT. OFF.

Aviation Gasoline — Aircraft Oil

STANDARD OIL COMPANY OF NEW YORK

Here is a partial list of manufacturers using Stromberg Carburetors as standard equipment:

RECOGNITION

AIRCRAFT

Aircraft Engine Corp.
The Alliance Aircraft Corp.
Allison Engineering Co.
American Cirrus Eng. Co.
Axelson Machine Co.
Continental Motors Corp.
Curtiss Aero & Motor Co.
Fairchild Caminez Eng. Corp.
Kinner Airplane & Motor Corp.
Lambert Aircraft Co.
(formerly Velie Motors Corp.)
LeBlond Aircraft Engine Co.
Lycoming Motor
MacClatchie Manufacturing Co.
Michigan Aero. Engine Corp.
Navy Department
Pratt & Whitney Aircraft
O. E. Szekely Corp.
War Dept.—Air Corps
Warner Aircraft Corp.
Wright Aero Corp.

AUTOMOBILES

Chrysler Corp.
Continental Motors Corp.
Cunningham Son & Co
Dodge Bros. Corp.
(Lincoln) Ford Motor Company
H. H. Franklin Mfg. Co.
Hupp Motor Car Corp.
Jordan Motor Car Co.
Locomobile Co. of America, Inc.
Marmon Motor Car Co.
Peerless Motor Car Co.
Pierce-Arrow Company
Sayers Scoville Co.
The Studebaker Corp.

MARINE

Consolidated Ship Bldg.
Sterling Engine Co.

TRUCKS, TRACTORS, ETC.

Acme Motor Truck Company
The Autocar Company
Brockway Truck Co.
Climax Engineering Co.
The Four Wheel Drive Auto Co.
Graham Bros.
Hercules Motor Corp.
Indiana Truck Corp.
International Motor Co.
International Harvester Co.
Le Roi Company
Lima Locomotive Works
Maccar Truck Co.
Minneapolis Steel & Mach. Co.
Minneapolis Threshing Machine Co.
Sanford Motor Truck
Schramm, Inc.
Selden Truck Co.
Stewart Motor Corp.
Waukesha Motor Co.

135 manufacturers use Stromberg carburetors as standard equipment. This impressive list, shown here, contains representative firms in every line of industry where motors are used.

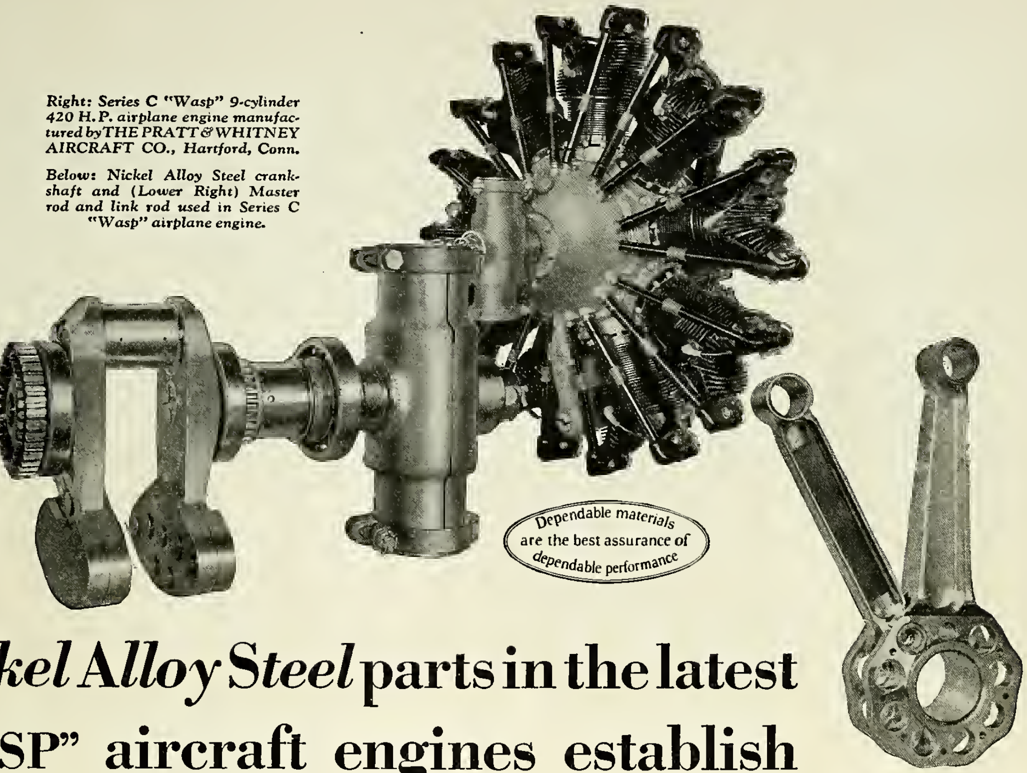
These firms KNOW that Stromberg superior performance is the result of the highest type of carburetion engineering, the finest workmanship, the best materials procurable.

They recognize real merit and are willing to pay for it.

STROMBERG MOTOR DEVICES CO., 58-68 E. 25th Street, CHICAGO

Right: Series C "Wasp" 9-cylinder 420 H.P. airplane engine manufactured by THE PRATT & WHITNEY AIRCRAFT CO., Hartford, Conn.

Below: Nickel Alloy Steel crankshaft and (Lower Right) Master rod and link rod used in Series C "Wasp" airplane engine.



Nickel Alloy Steel parts in the latest "WASP" aircraft engines establish new standards of wear-resistance

THE Pratt & Whitney Aircraft Co., in introducing the Series C "Wasp" engine, takes another step toward the perfection of the original "Wasp" engine brought out three years ago.

This latest engine retains all the fundamental features of design of the original "Wasp", but incorporates many new refinements which represent the experience gathered from many millions of miles of commercial flying and extensive naval and military use.

The Series C engine is stronger, more powerful, more durable, and generally more efficient than previous models, and its makers believe it is the nearest approach to mechanical perfection ever achieved in an aeronautical engine.

Probably there is no better standard by which the engine can be judged than the results of the 50-hour endurance run required by Navy contract.

There were no failures of any nature during the entire test and the engine exceeded all requirements by a wide margin. It developed more horse-power, burned less fuel and oil, and, in addition, because of the confidence of its makers, was run under conditions far exceeding the set-down requirements. Throughout the entire 50-hour period, the engine was operated at full throttle.

At the conclusion of the test, the engine was disassembled and carefully inspected. Its condition was excellent. No parts showed signs of excessive wear. Of special interest is the fact that the big end bearing clearance of the master rod with the Nickel Alloy Steel crank pin was identically the same at the conclusion of the test as when first installed.

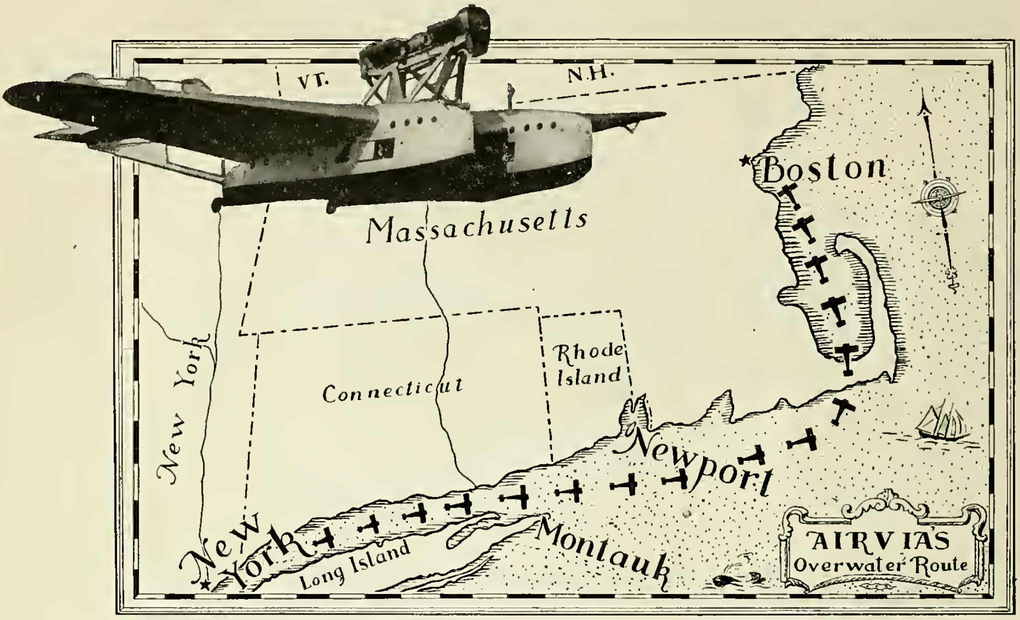
Probably the most impressive evidence of the uniformly dependable mechanical properties of Nickel Steel parts, is the fact that practically all manufacturers of airplane engines, both in America and Europe, have adopted Nickel Alloy Steels for highly stressed parts, the weight of which must be pared to a minimum.

Nickel
FOR ALLOY STEEL

You are invited to visit our Booth at the 11th National Metal Exposition of the American Society for Steel Treating, Public Auditorium, Clevelend, Ohio, September 9th to 13th inclusive, Space No. 94.

INCO NICKEL THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL STREET, NEW YORK, N. Y. INCO NICKEL

New York to Boston, over water



via AIRVIA

Roger Q. Williams
President

Lewis A. Yancey
Vice President

E. K. Jaquith
Vice President

Charles E. Ramsgate
Secretary

THE new ***over-water*** passenger air service between New York and Boston was opened on July 22nd by the AIRVIA TRANSPORTATION CORPORATION, when the first of its planes took off from the N. Y. Air Terminals, Inc., seaplane base at North Beach, N. Y.

The famous double-hull, twin-motored Savoia Marchetti flying boats, with a capacity of twelve passengers and two pilots, are being used. *Roger Q. Williams* and *Lewis A. Yancey* are the names of the two planes now in service.

Operating on a regular daily schedule, one may leave New York at 11 A. M. and arrive in Boston at 1 P. M. The return plane leaves Boston at 3 P. M., reaching New York at 5.

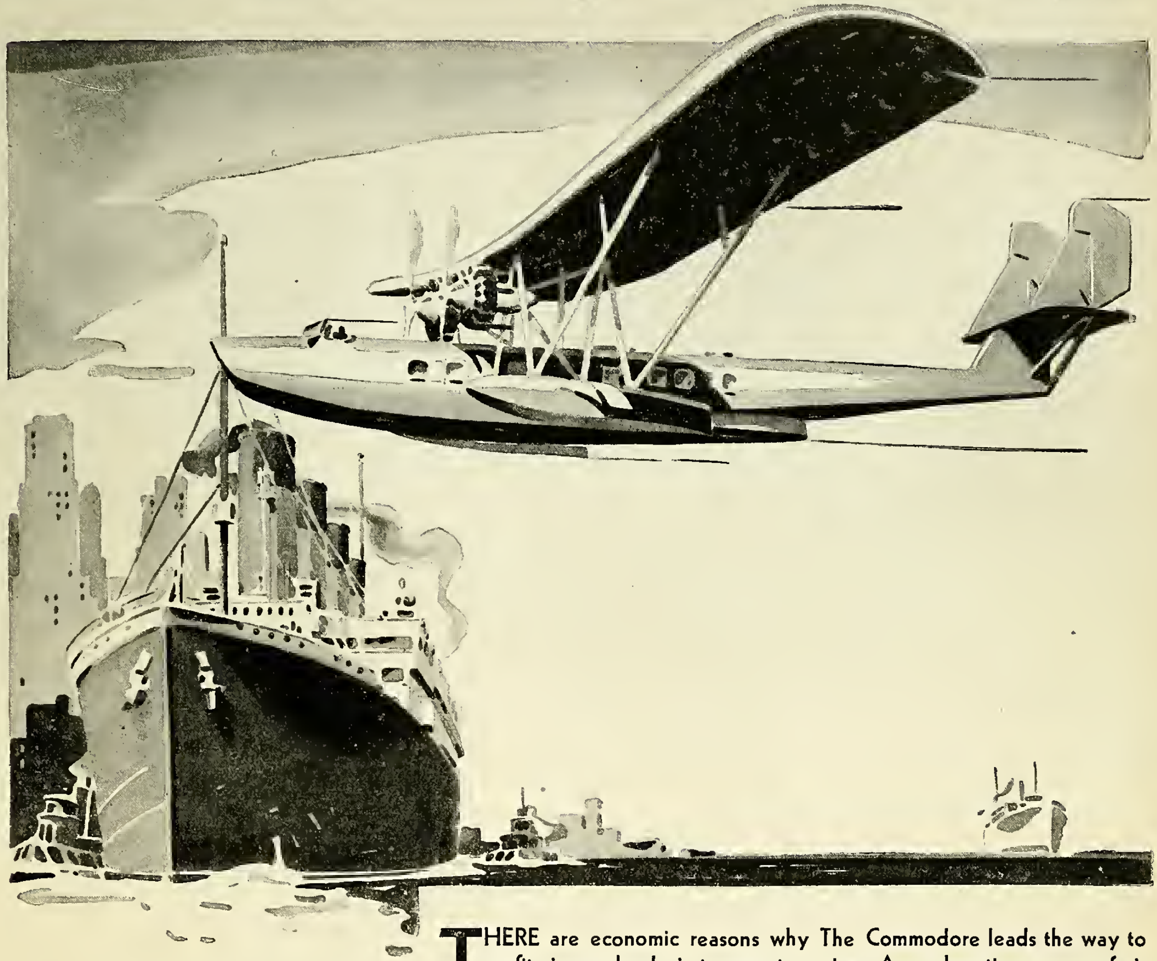
Fare: $30 each way, including 25 pounds of luggage. Baggage up to 10 pounds in excess of this may be taken at 50¢ per pound.

Airvia flying boats are available for charter to all coastal, lake and river cities.

AIRVIA TRANSPORTATION CORPORATION
30 Broad Street, New York City
Telephone Whitehall 2753-4-5
Boston Office: Aviation Business Bureau, 185 Devonshire.
Telephone Hubbard 0137

J

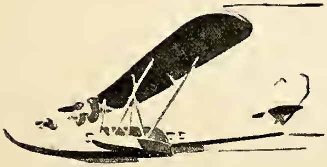
THE WAY TO PROFITS—



THERE are economic reasons why The Commodore leads the way to profits in payload air transport service. An exhaustive survey of air routes, geography, topography, population and many other factors—led to its design as a flying boat. For, against a total known landing area of 396 square miles for land planes, the survey disclosed 147,713 square miles of water suitable for the safe landing of flying boats in the United States. Of our twenty-five most populous cities, twenty-four are on waterways suitable for water landings. The Commodore needs no expensive landing fields. Water landings save time—since they are seldom, if ever, as remote from city centers as landing fields.

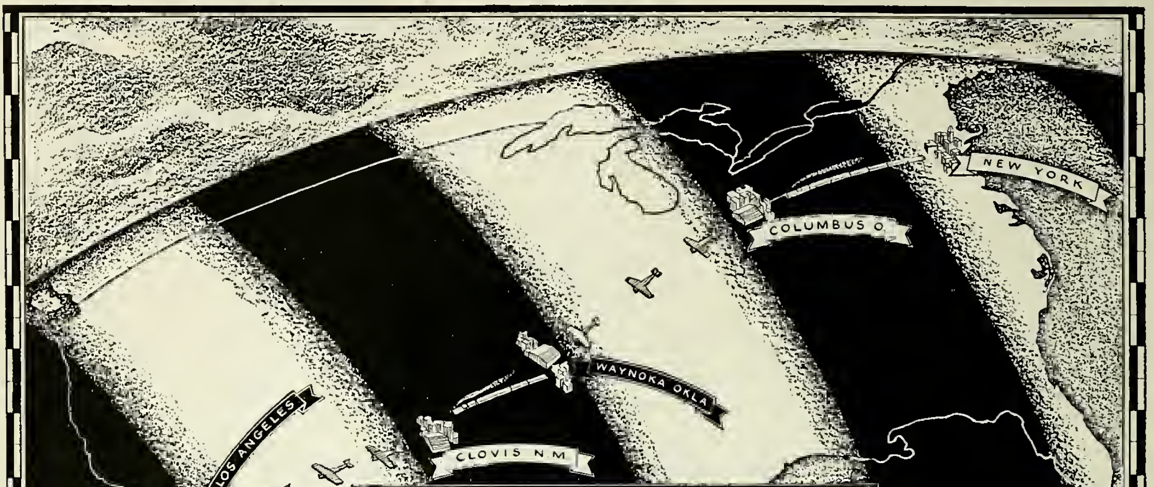
With an overall length of 60 feet and a wing spread of 100 feet . . . The Commodore is truly a Leviathan of the air. Built to carry 8000 pounds of useful load with passenger accommodations for 20 persons, and a cargo capacity of 200 cubic feet. Cruising radius 1000 miles at 110 miles an hour.

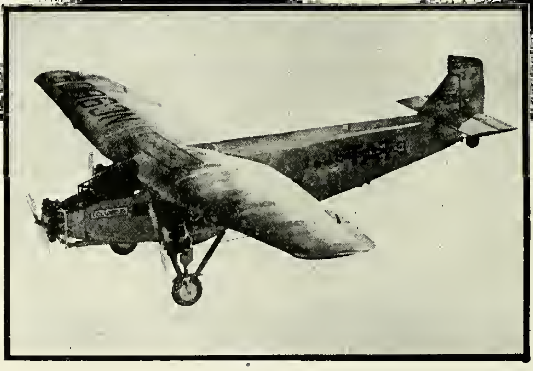
We will gladly submit facts and figures that show how and why The Commodore is especially adapted to the immediate and growing needs of air transportation.



CONSOLIDATED AIRCRAFT CORPORATION, BUFFALO, N. Y.

The COMMODORE -





"The City of Columbus," flagship of the fleet of planes built by Ford Motor Company for Transcontinental Air Transport.

THE LANES OF THE SKY

meet the lines of the land

RAIL transportation has acknowledged the airplane as an ally.

Passengers on the T. A. T. leave New York with the twilight, roll through the night in a Pullman bed, fly above earth in luxurious surroundings during the hours of daylight, and land, at the end of the second day, in Los Angeles. Two wonderful panoramic days and two comfortable nights to span the continent! Incredible time, surrounded by every element of safety that the science of rapid travel can bring to bear.

* * *

It is entirely in order that the Ford Motor Company should share in this great co-ordination of air and rail transport. That company has pioneered the principle of a power vehicle that "takes you there and brings you back," reliably . . . safely. It gave to the automobile its first real commercial meaning. And with the same ideals—with a perfected organization and perfected tools, it is establishing the Ford plane as a definite factor in both commercial and travel life.

Nothing could be more indicative of the trend in aircraft design than that the Ford engineers, always alive to factors of strength, durability and safety, have adopted strong Aluminum alloy and Alclad Aluminum alloy sheet for a vast majority of their fabricated aircraft parts.

* * *

More than half of the material in even the engine consists of strong Aluminum alloy—and the balance of the entire ship—with the exception of a very few steel and rubber parts—is fabricated from Aluminum and its alloys.

Aluminum Company of America, creator of these alloys and foremost authority in their use for aircraft purposes, solicits inquiries for sheet, tubing, castings, forgings and screw machine parts. Personal contact with the technical staff is invited.

Aluminum Company of America
2484 Oliver Bldg., Pittsburgh, Pa.
Offices in 19 Principal American Cities

ALCOA **ALUMINUM** AND ITS ALLOYS **FOR AIRCRAFT** ALCOA

LEADERSHIP that makes for GREATER VALUE

FAIRCHILD was the first American manufacturer to build a line of commercial airplanes with oleo spring landing gear, a design feature of prime importance for smooth taxiing and jarless landings.

Fairchild was the first to build a folding wing monoplane for commercial use. The advantages of this construction for economy of operation have been proved over and over again.

Fairchild designed and built interchangeable composite metal and wood pontoons, unique for flexibility, ease of attachment, and serviceability.

These are only a few of the significant ways in which Fairchild leadership is expressed—and to which, incidentally, competition has paid the tribute of emulation and imitation.

It is such leadership in research and development that makes Fairchild products so desirable to pilots and operators—and the Fairchild full line franchise so valuable to dealers.

Fairchild's resources and Fairchild's adherence to the policy of "Finding the One Best Way" justify the expectation that Fairchild will continue to lead in pioneering real improvements and in manufacturing methods.

FAIRCHILD

THE FULL LINE

As a training and sport plane the two-place **FAIRCHILD KR 21** *has precisely the right response to controls—not too sensitive, but not sluggish. Kinner engine. Tapered wing construction adds unusual maneuverability.*

FAIRCHILD . . .
MORE THAN THE NAME OF A PRODUCT

FAIRCHILD has great financial strength but it is not resources alone which give Fairchild leadership in the industry.

It is because these resources are dedicated to the purpose of continuing to pioneer and develop improvements in Fairchild products—with modern plants, close inspection methods, and special machinery to manufacture them to the Fairchild standard of "the one best way"—that Fairchild capital has its great significance.

And because Fairchild spreads overhead over a complete line of products, the cost of each is thereby reduced.

Fairchild is more than the name of a product. It is a standard of engineering and research as well, and a logical development out of service.

It is for such reasons that Fairchild means quality and value and profit opportunity elsewhere unequalled.

COMPARE THEM . . . TEST THEM . . . WE CHALLENGE THE INDUSTRY WITH THE *FAIRCHILD KR* LINE

THERE is no test that Fairchild welcomes more confidently for Fairchild KR biplanes than comparison.

By that method, you can best determine how Fairchild KR engineers have eliminated unessentials in perfecting simple design and easily maintained construction.

You can thus assure yourself of the skilled fashion in which light weight has been achieved without sacrifice of strength, through the use of chrome molybdenum steels and other similarly high-grade materials.

You can compare detailed specifications of equipment and finish with any other plane in its class, to the benefit of your investment in Fairchild KR.

FAIRCHILD

THE FULL LINE

You can check Fairchild KR finer performance and greater payload by actual flying. And because there are more than 200 ships of this design in service today, it is easy for you to judge of Fairchild KR durability and stamina from actual records of performance over a period of time.

And when you have gathered all these facts, you will be amazed to learn the low first cost—and you will readily understand the low maintenance cost—of Fairchild KR.

Even if you pay far more, we do not believe you can buy a better value than the Fairchild KR 34. And Fairchild KR 21 for sport and training purposes is a real pilots' ship, in power, controllability and ease of handling, at a price which gives it unequalled value.

FAIRCHILD ACTIVITIES ARE WIDESPREAD

FAIRCHILD began with the perfecting of the aerial camera. Fairchild Aerial Camera Company today has clients all over the world. Fairchild Aerial Surveys gives service anywhere in North America.

It was to supply public demand for an airplane uniquely designed to meet the exacting requirements of aerial photography that Fairchild began the general manufacture of airplanes, now built in plants at Farmingdale, L. I., New York, Hagerstown, Maryland, and Longueuil, P. Q., Canada.

The manufacture of special design pontoons and of skis is another Fairchild activity. Fairchild is also a well known builder of boats. Fairchild landing lights of a wholly new design are in great demand.

This is, in brief, the present extent of Fairchild Aviation Corporation which, with $10,000,000 current assets, is one of the outstanding companies.

The three-place FAIRCHILD KR 34. *Wright 165 h.p. engine. Gets off the ground quicker, climbs faster, shows more speed in the air than any other airplane using the same power plant and carrying an equal load.*

F A I R C H I L D

THE FULL LINE

The seven-place FAIRCHILD 71, *soundproofed and stable, offers luxurious comfort to match its high performance. Greater payload than any other cabin monoplane using 425 h.p. "Wasp" engine.*

Here are FIVE PRINCIPAL REASONS why FAIRCHILD "71" can make you money

—because it is better business to adapt one or more Fairchild seven-place units to fluctuating traffic needs than to put more money into a single bulkier ship and fly it only partly full.

—because Fairchild folding wings save hangar space and reduce operation costs.

—because Fairchild "71" is a ship of proven dependability and stamina. Operators all over the western hemisphere, flying in every sort of climatic condition, can tell you.

—because Fairchild "71," thru pontoons of exclusive Fairchild design offers special advantages as a seaplane. There are more Fairchild seven-place cabin airplanes on pontoons than all other like airplanes combined.

—because Fairchild "71" has a greater payload and lower cost performance than any other cabin monoplane with "Wasp" power.

And these are not all the reasons. We'll be glad to give you many more, if you'll write us.

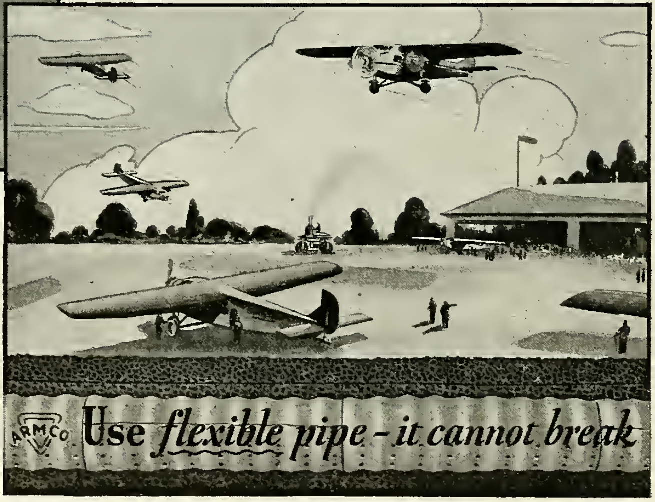
Write or wire for information to Farmingdale, Hagerstown, or district offices at 332 S. Michigan Ave., Chicago; 2102 N. Harwood Ave., Dallas; 224 East 11th St., Los Angeles. In Canada, Fairchild Aircraft Ltd., 505 Confederation Bldg., Montreal, P. Q.

FAIRCHILD AIRPLANE MANUFACTURING CORPORATION
FARMINGDALE, L. I., NEW YORK
Plants: Farmingdale, N. Y., Hagerstown, Md., Longueuil, P. Q., Canada

FAIRCHILD

THE FULL LINE

Is your Airport *handicapped* with a field torn up for drain replacement?


ARMCO
Use *flexible pipe* - it cannot break

Lasting ARMCO Subdrains *keep* Airports *in service*

DRAIN replacement is a real menace to flying safety. During repairs, ground must be torn up, so it is useless for landing or takeoff.

America's leading airports have found the answer to this serious problem in Armco Perforated Pipe. Because it is flexible this pipe will resist impact from airplanes, trucks and rollers, even through crushed rock backfill. When required this rugged drain can be laid close to the surface to secure a rapid runoff of surface water—the flexible pipe absorbs the pressure of freezing water and swelling soils without damage.

Additional information on drains that keep airports in service will be sent on request—no obligation.

ARMCO

Armco culverts and drains are manufactured from the Armco Ingot Iron of The American Rolling Mill Company and always bear its brand

ARMCO CULVERT MANUFACTURERS ASSOCIATION
Middletown, Ohio

© 1929, A. C. M. A.

SAFE!

Over Land *and* Over Water

A WELL designed Amphibian is SAFE. It fears no emergency, for it can make a perfect landing *both* on water and on land. The Savoia-Marchetti Amphibian now offers the climax of twelve years' exhaustive engineering development and successful building.

Every condition that the owner might face unexpectedly has been met, studied, provided for, during these years of constant perfecting.

For Individual Flying, Training and Club Use, the 3-place "S-56", Kinner engine powered Amphibian pictured above, is quite the most interesting offering of 1929.

For Commercial or Private Use, the 7-place "S-62" cabin type is furnished as either amphibian or flying boat.

For Transport, the famous "S-55" 12-passenger twin-hull flying boat is quite the most distinctive ship ever built—in appearance, performance and in its long record of dependable flying. It is the ship used by Marquis de Pinedo in his memorable 60,000 mile tour of 6 continents in 1927. Savoia-Marchetti also holds the world's record for long distance flight, established by Capt. Arturo Ferrarin and Major Carlo del Prete; 4466.5 miles in 51 hours 59 minutes.

Illustrated catalog, specifications, prices and franchise terms will be supplied upon request.

American
SAVOIA MARCHETTI

American Aeronautical Corporation

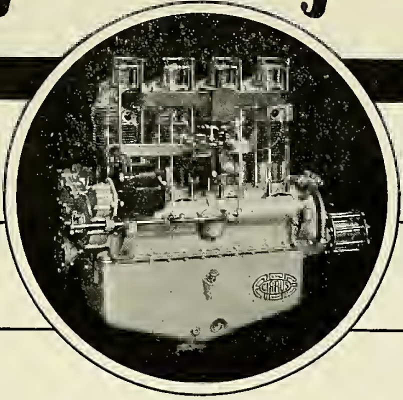
Executive Offices
730 Fifth Avenue, New York

Factory and Airport
Port Washington, L. I., U. S. A.

Architect's elevation of Administration Building, American Aeronautical Corporation's Factory, School and Seaplane Air Terminal, now under construction on Manhasset Bay at Port Washington, L. I., U. S. A. (Temporary factory at Whitestone, L. I.)

This speaks for itself

AMERICAN CIRRUS MARK III



GREAT LAKES AIRCRAFT CORPORATION

CLEVELAND, OHIO

Mr. F. R. Maxwell
American Cirrus Enginee, Inc.
Belleville, N. J.

July 6, 1929

Dear Mr. Maxwell:

Returned yeeterday from Bradford, Pa. Raced the AMERICAN Engine there Saturday. Got beat but under the conditions don't think it wae so bad. In the clase I raced the limitation was air-cooled engines up to 200 horse power. I took fourth place against engines ranging from 110 to 165 Horse Power and in most casee airplanes specially streamlined for racing. Better luck next time.

Coming back from Bradford, I ran thru about four thunderstorms. Didn't know for certain whether the engine would drown out but apparently water did not affect it. Then just before I reached Cleveland, I ran into one of the hardest storms we have had in this section. The rain came down in sheets and there wae a wind very near gale velocity. It had been necessary due to wind to run the motor up to near 2000 R. P. M. to make headway and I had been in the air about two houre, then in the etorm I had to open up to full throttle to hold my own. We bounced all over the sky, got soaked to the skin, but came thru O. K. The motor never missed a lick and showe no eigns of heating or abuse (and it certainly had it for nearly an hour) the rain was so severe the paint on the cowling was stripped off for about twelve inches on each side and the entering edge of the propellor was oompletely ruined.

I am leaving tomorrow for Texas, using the AMERICAN Engine. Will have some data on performance thro the heat conditions down south under probably the worst flying conditions we have in this country. So far, we have about twenty hours on the engine in flight, with perfect results. Oil temperature had never been over 60 degrees centigrade.

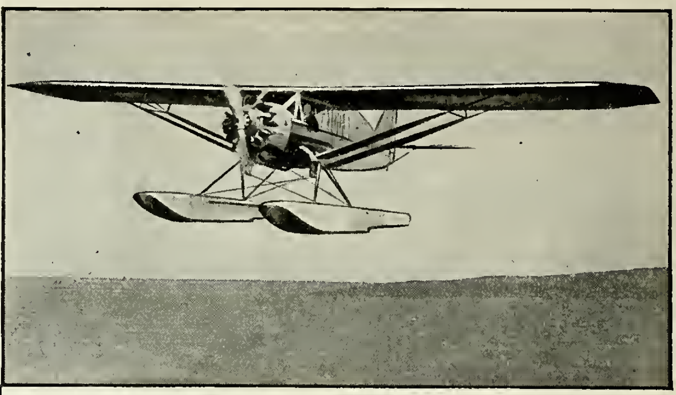
So far I'm entirely satisfied and the more time I put on it, the more confidence I'm developing, particularly after the experience yesterday. More later, ae things develop.

With best regards, I am

Sincerely yours
Chas. W. Meyers

AMERICAN CIRRUS ENGINES, INC.

WASHINGTON AVENUE
BELLEVILLE, N. J.



the outstanding combination of payload and performance on wheel gear or floats . . .

BELLANCA CH 300 MONOPLANE

Standard Specification

U. S. Dept. of Commerce Approved Type Certificate No. 129

Powered with the Wright "Whirlwind Nine" (J-6) Engine. Quickly disassembled into easily-shipped and easily-handled units. Two pilots; dual control; cockpit with entirely exceptional range of vision. Seats six persons in comfortable, tastefully appointed cabin. Pilot and payload: 1,215 lbs. Range with full payload: 5 hrs. or 600 miles at cruising speed. High speed, 145 m.p.h. Cruising speed 122 m.p.h. Landing speed, 48 m.p.h. Climb at sea level, 1,100 ft. per min.

BELLANCA SEAPLANE

Standard Specification

U. S. Dept. of Commerce Approved Type Certificate No. 129

Powered with the Wright "Whirlwind Nine" (J-6) Engine. Cabin arrangement same as the CH 300. Easy access to cabin doors and cockpit from floats at both sides. Useful load, as Seaplane: 1,770 lbs. Pilot and payload: 1,205 lbs. Range with full payload: 5 hrs., or 550 miles at cruising speed. High speed, 130 m.h.p. Cruising speed, 110 m.p.h. Climb at sea level, 750 ft. per min. The floats used as standard equipment are made by Edo; their design is the result of years of experience, and they can be relied on for both serviceability and water performance. Complete specification of either type plane, sent on request. Demonstration flights conveniently arranged.

Because of its unusual reserve strength and performance on wheel gear, the Bellanca CH 300 payload capacity is practically unaffected by conversion to floats. Equipped with the 300 h.p. Wright "Whirlwind Nine" (J-6) Engine, equally efficient and effective on wheels or floats, the "snap" of the Bellanca at the take-off—the astoundingly large load easily lifted and flown—measure a rate of performance unchallenged by many planes of far greater engine power.

More than that: the amazing performance of the Bellanca is combined with a *structural strength 12% in excess of Department of Commerce requirements.* Some of America's greatest exponents of stunt flying have again and again demonstrated the strength of the Bellanca, as well as its wide range of smooth, stable control. There can be no greater guarantee of safety and serviceability. Bellanca Aircraft Corporation, New Castle, Delaware.

BELLANCA
AIRCRAFT

BUY ON TIME
PAY 40% DOWN
REST IN 10 MO'S

The new A. A. C. plan offers airplane purchasers finance rates 33 1/3 to 100 per cent lower than any company has ever offered before. Today the buyer can actually finance his ship for less and just as simply as financing an automobile.

EASY PAYMENTS
ON EAGLEROCK
YOU MAY CHOOSE

There is no insurance required. There are no unacceptable obligations such as are generally found in airplane finance plans. Establishment of your responsibility is all we ask. On the unpaid balance including all interest, only 10 per cent is charged.

YOUR AIRPLANE
EARNS REVENUE
FROM THE START

Many buyers are easily meeting their semi-monthly payments out of the earnings of their Eaglerocks. *Note:* Under this plan we have money-making opportunities for salesman-pilots moderately financed. Write today if you believe you can qualify.

KINNER 100 H. P.

$1,662.80 *down and payments of* $137.19
Flyaway Factory

In visibility, ruggedness, performance, ease of handling and normal control in all positions it is close to perfection. It is a low cowling job and an ideal ship for student training as well as for students after training. It can be used in commercial work whereas most training ships are *one purpose* planes.

HISSO "A" 150 H. P.

$1,400 *down and payments of* $115.50
Flyaway Factory

The standard Hisso "A" EAGLEROCK with government overhauled motor has performance at top speed comparing favorably with ships selling for twice so much. It is one of the best and most easily controlled EAGLEROCKS in the line. For advanced training, cross-country work and general commercial flying, it has no equal in low first cost and economical operation.

WRIGHT J-6 165 H. P.

$2,338.80 *down and payments of* $192.96
Flyaway Factory

Popular because of its performance, smoothness and small gas consumption. Those who want flying ability and economy in the medium price class will appreciate the Wright motored EAGLEROCK.

CHALLENGER 170 H. P.

$2,443.60 *down and payments of* $201.60
Flyaway Factory

In actual performance the 170 h.p. Challenger motored EAGLEROCK has a top speed of 130 M.P.H. It is a wonderful ship for demonstrating, sport flying and fast cross-country work.

COMET 150 H. P.

$2,338.80 *down and payments of* $192.96
Flyaway Factory

Beautiful lines, marvelous climbability and economical operation make the Comet motored EAGLEROCK an ideal plane for the sportsman, the passenger hopper, or the air school operator. Cruises at an effortless speed of 108 miles per hour. Landing speed on a par with the old long wing EAGLEROCK.

.32 BULLET

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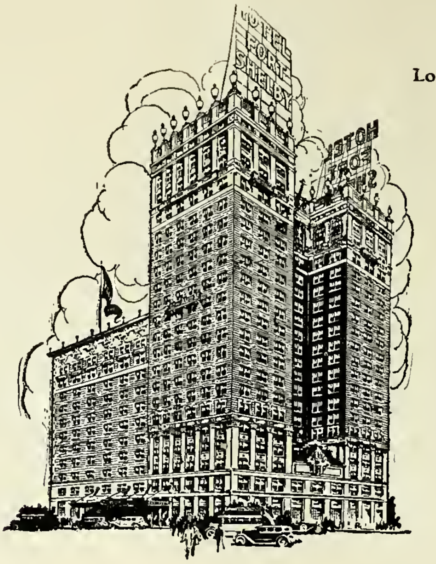

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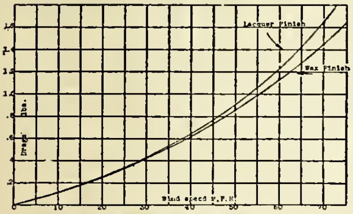

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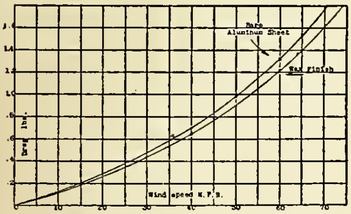

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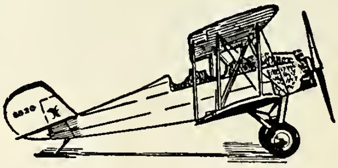

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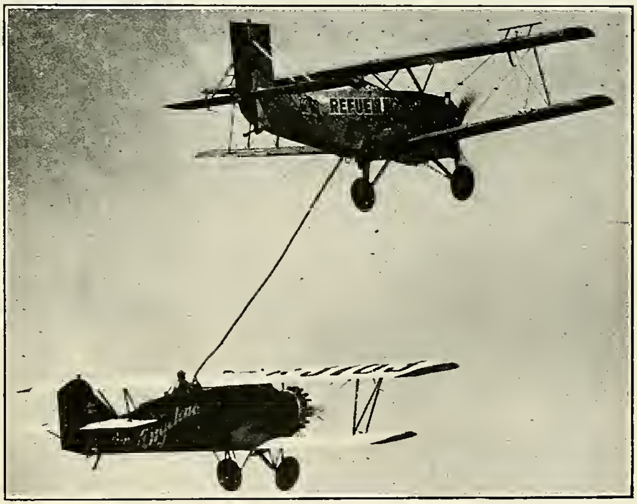

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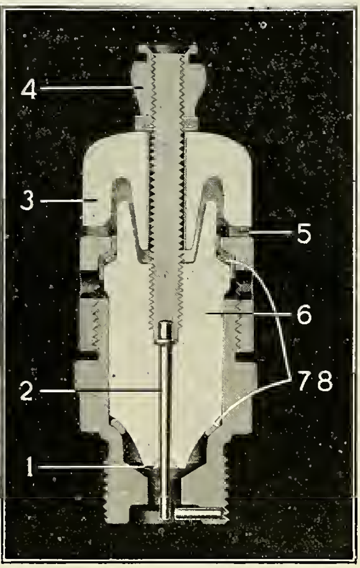

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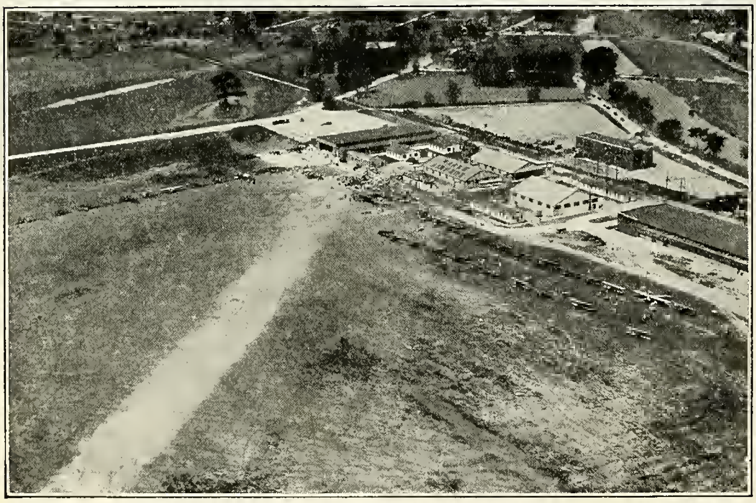

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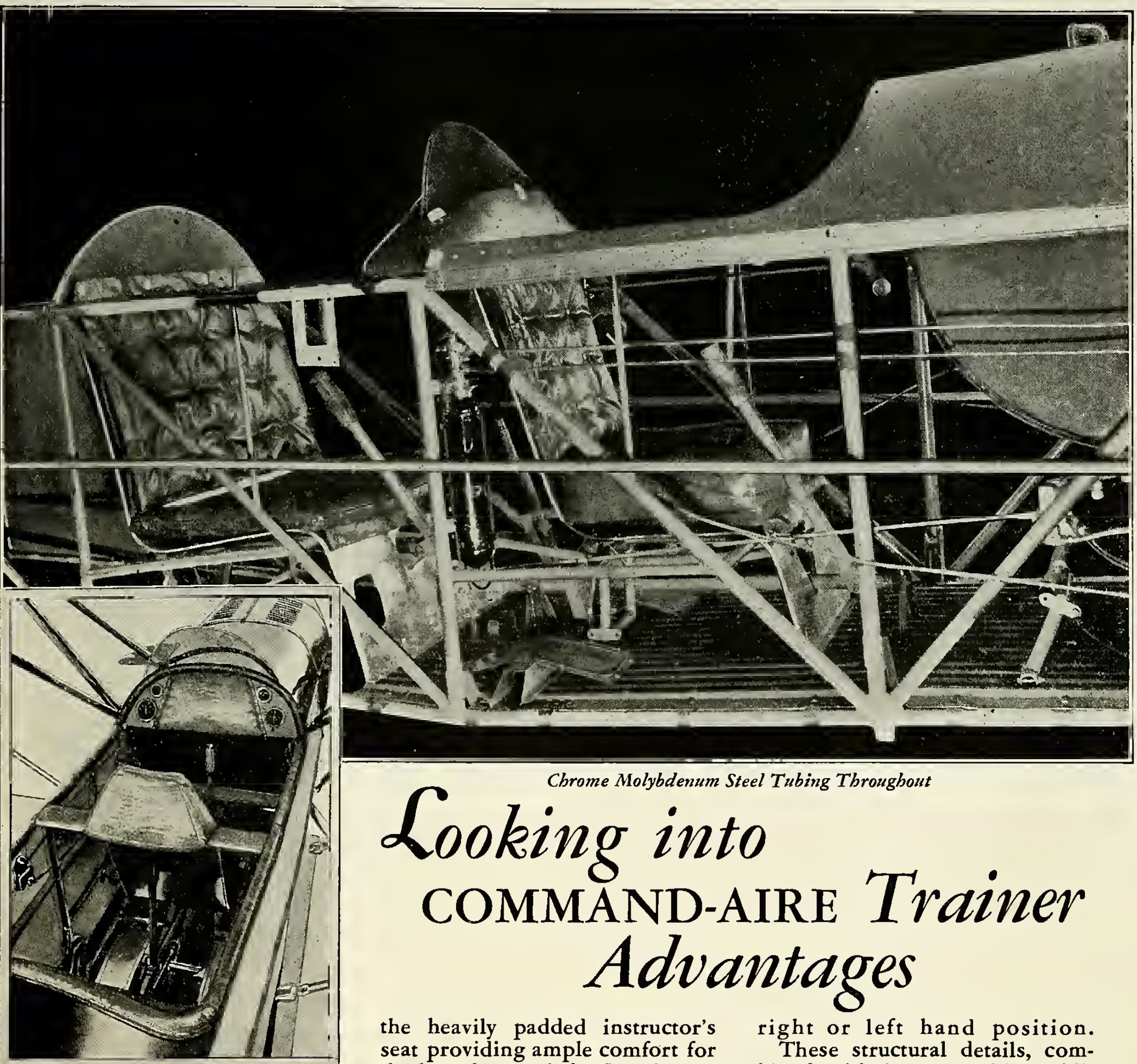

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Wing Area	303 sq. ft.
Length Overall	24 ft., 6 in.
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Chord	5 ft.
Gap	5 ft.
Stagger	6½ in.
Dihedral, Upper Wing	None
Dihedral, Lower Wing	2 degrees
Weight Empty	1380 lbs.
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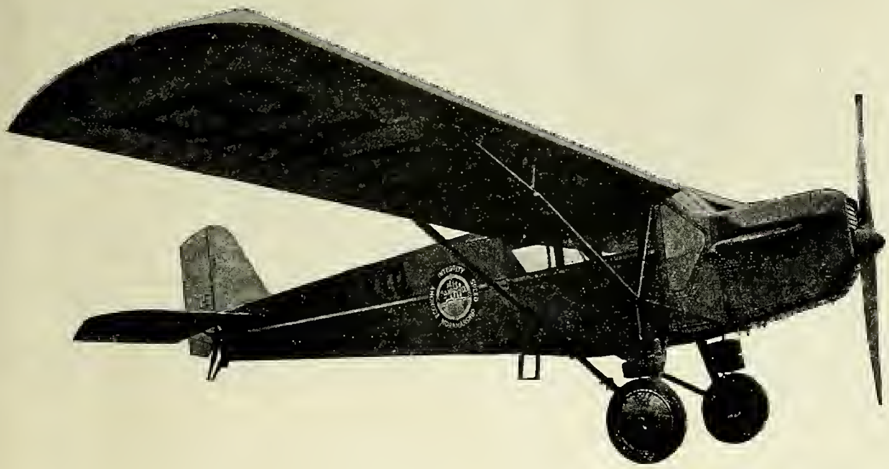

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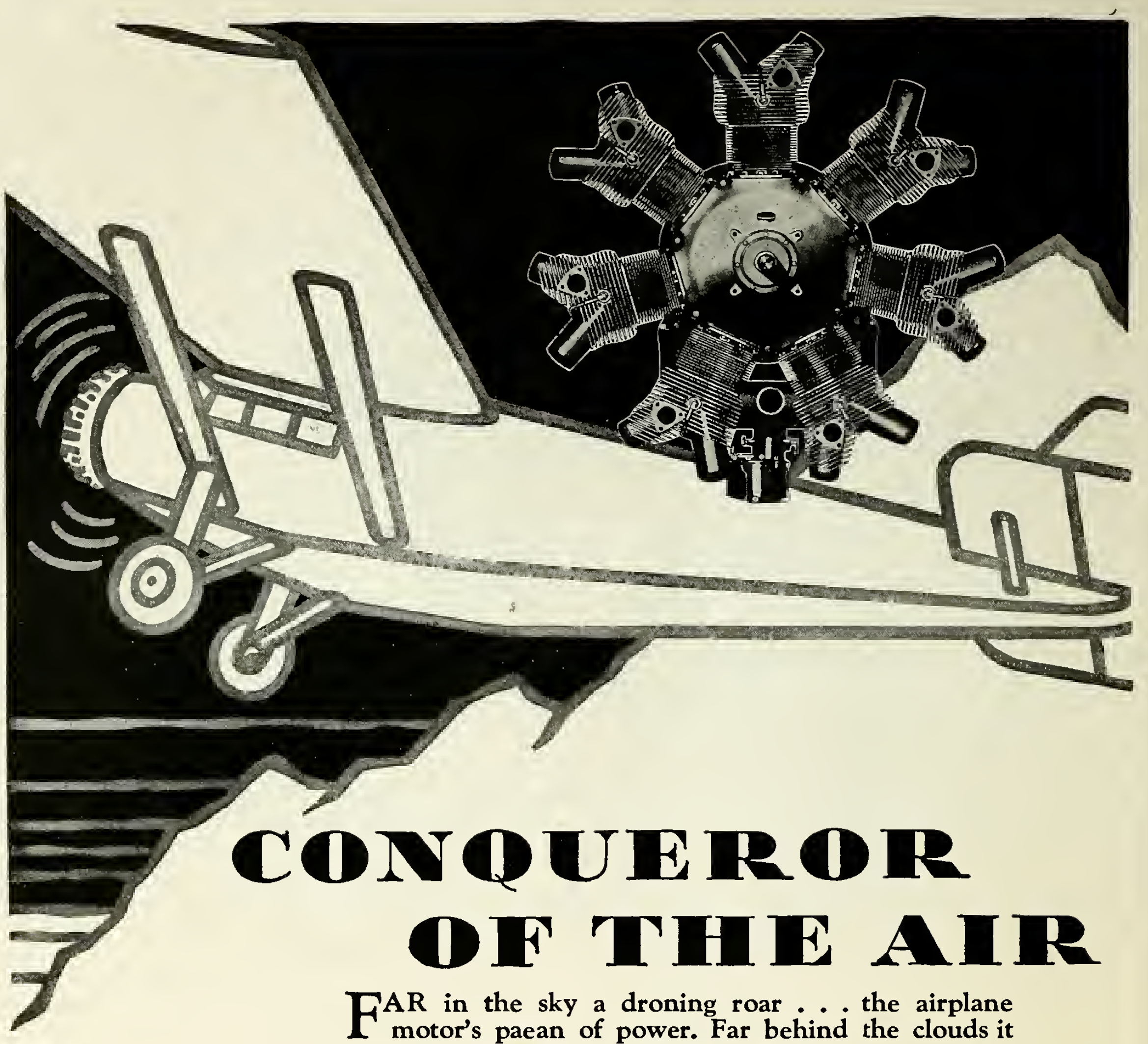

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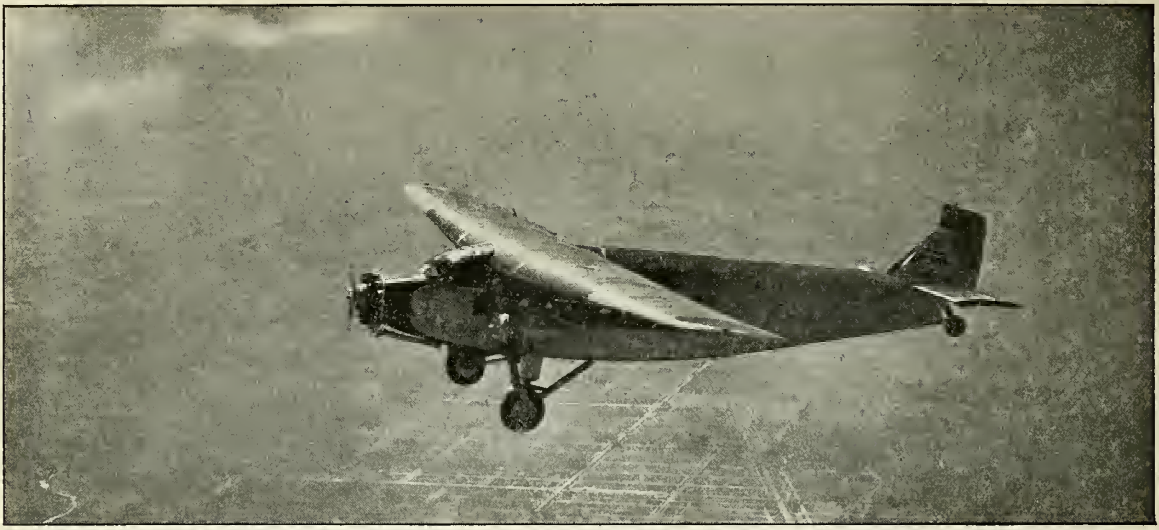

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Volume 15
No. 2

AERO DIGEST

AUGUST
1929

THE MAGAZINE OF THE AIR

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AERO DIGEST

Telephone: Wisconsin 3771. **is published monthly by** Cable Address: AERODIG
THE AERONAUTICAL DIGEST PUBLISHING CORP., 220 West 42nd Street, New York City
Frank A. Tichenor, President. A. Horsfall, Vice-President. J. E. Horsfall, Treasurer. K. Healy, Secretary.
George F. McLaughlin, Editor. Robert B. Renfro, Associate Editor. William A. Rogers, Advertising Manager.
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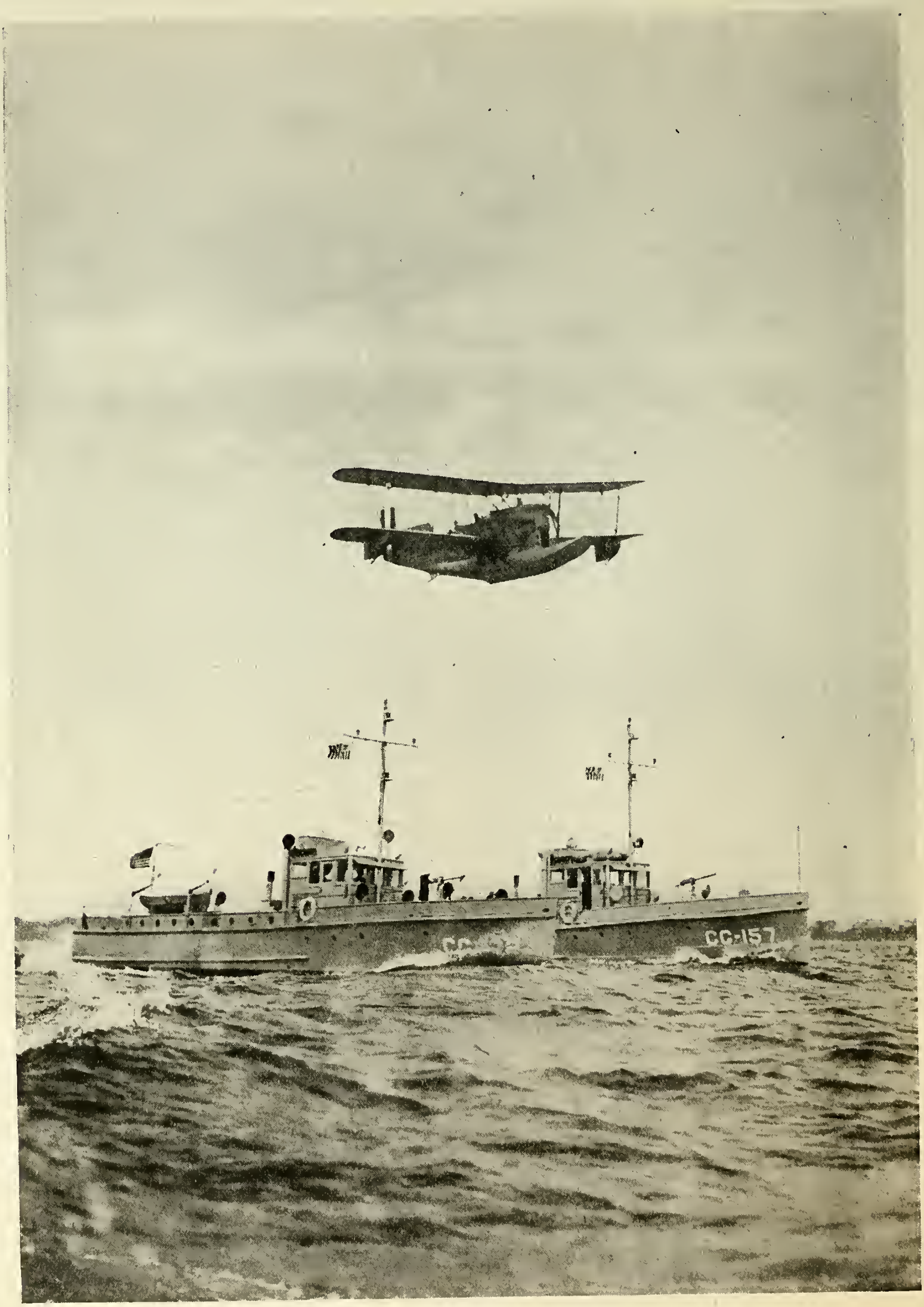


Coast Guard sea and air patrol off the New England Shore

THE AIR PATROL OF THE COAST GUARD

By
A. G. West

WHEN the United States Government first established the air patrol, which for some years past has watched over and protected a part of the most dangerous section of our North Atlantic seaboard, it is probable that no one realized that this nation was to be a pioneer in thus organizing an efficient system of life-saving by aircraft.

And just as the Forest Service not so long before had blazed a new trail through the dim aisles of age-old forests toward science and knowledge of saving trees by woodcraft, so the Aviation Unit of the U. S. Coast Guard blazed an air trail of safety for mariners and for the freighted "Purple Argosies" of the commerce of a nation.

Perhaus it may seem curious that it was not at once appreciated to what an extent this new system of scouring the seas along our far-flung coast line might mean in terms of security for lives and property. Aviation had made tremendous strides during the war, and as a result, there had come something of an adjustment toward this new mode of transportation, and a renaissance of interest as to its future in business and trade. But it is more than likely that this same interest was, in many cases, little more than a frugal gesture to utilize the trained pilots and surplus planes of war days, and to adapt them, as well as might be, to the needs of a busy and fast-growing nation.

These needs were particularly acute with respect to the fishing industry, whose financial gain or loss is so greatly dependent upon the vagaries of the weather, and whose bases of operations must shift with the season in spite of gales that might ravage the coast. The thought thus came that with the aid of airplanes, more men and their dories might be located and picked up after storms, and more contraband might be detected, than with the older and slower method of combing that same area with the patrol boats. Or that perhaps a combination of the two methods might be the most effective of all.

And so it proved. But as in many another instance where the use of aircraft has been in question and where the deeply-rooted traditions of the sea have been involved, selling this idea to the officials was by no means easy, and the start of the air patrol was, in consequence, so modest as to have discouraged a less ardent band of enthusiasts.

In the first place, there was no hangar. But that was soon remedied by borrowing a tent hangar from the Army Air Corps. The new unit had no plane either, and what was worse, no money with which to buy one. The Navy was sufficiently interested in the venture to loan the Coast Guard a new plane, if assurance were given that it would be well cared for.

At Squantum, Mass., there is a large and hospitable naval air station. It is there that many of the college youths of New England have taken their flight training for the Naval Reserve each summer. With the aid and encouragement of this organization, the Coast Guard aviation unit collected itself together.

The pilot must be ready to throw a line for the breeches buoy to mariners in distress.

The excitement was intense when the crates arrived with the new seaplane, which proved to have an excellent engine, and fortunately so. Although history fails to have recorded a christening, the U. S. Coast Guard Aviation Patrol took off shortly after the new ship had been uncrated and assembled, with the pilot, Lieut. Leonard Melka, at the stick for the test flight.

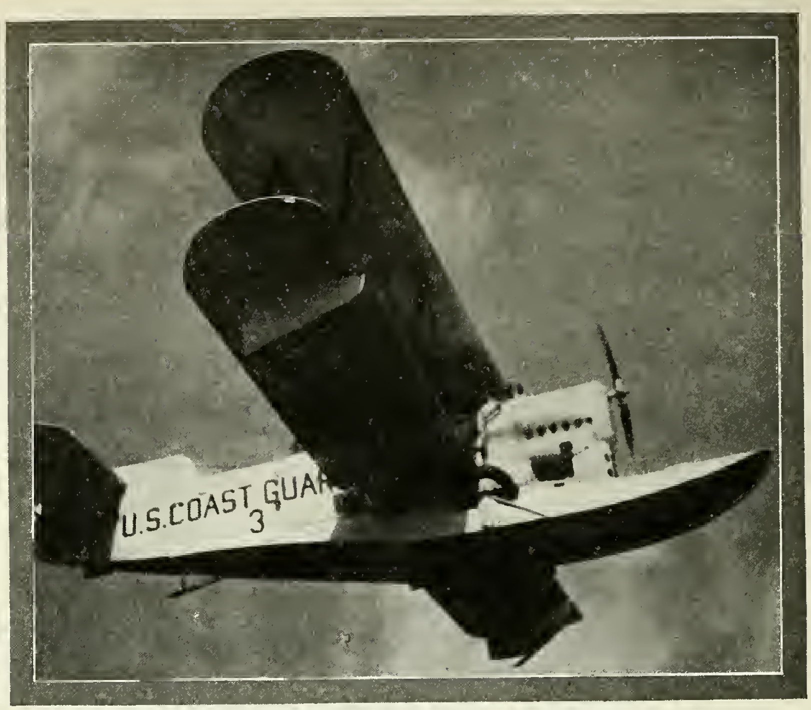
It had been quite a problem where to select the site for the base, which was nothing more than a bunch of rock lying off Gloucester, and known as Ten Pound Island. Pilots flew over there from Squantum, and shook their heads gloomily. They returned with sound advice, of which the gist ran somewhat as follows: "You're crazy. That place is full of rocks and boulders. How do you think you are going to get in and out of there with a plane?" But the work went right ahead, rocks or no rocks, and long after dark and up until midnight, the pilot and his assistant carved out the base from this eyrie.

The patrol began with two flights a day up and down the coast of Massachusetts and Maine. The mechanic was a fortunate choice; he had been grabbed off a patrol boat for this particular labor after a study had been made of the best motor machinists in the fleet. Inducting him into aviation was a simple process, but before turning him loose in aeronautics, his superior officers firmly impressed him with the fact that, if the engine failed at any time, it was extremely likely that he would be among those present in the plane at the moment it was forced down. There was also the factor of flight pay, and this item, together with the fact that the men in aviation have a chance to be with their families, was an added incentive for him to be extraordinarily careful in his work, for in the Coast Guard no man is so valuable that he cannot be immediately replaced. With the first bit of careless work, each member of the unit realizes that he stands a strong chance of being re-transferred to one of the patrol boats at sea.

The net result of this scheme, by the way, is so effective that the Coast Guard is said to have had but *one* forced landing and no crashes in all its history in aviation. In view of the fact that it has flown hundreds of thousands of square miles during a period covering in all about twelve years, over foggy and dangerous seas, in all kinds of wind and weather, this is something of a record.

The new form of aerial protection by the plane found instant favor with the wives and families of the men of the fishing fleet off Gloucester. The pilot made a patrol before and after every storm, and men who had been reported lost or missing were located and word sent to the nearest patrol boat to pick them up.

Much valuable gear is often lost after storms from the fishing boats, and these have been reported by the pilot, and thus recovered. Men bucking the seas in open boats have been aided before a tragedy occurred. On one occasion, a woman called up the base during a storm and said that she had a friend whose husband was overdue four days. She wanted to know what the Coast Guard could do toward finding him. There was a stiff wind blowing at the time, but the woman was so insistent that the commander finally felt that something could be done in spite of the fact that it was too rough to send a patrol boat out. Consequently, a plane was sent out for the search. The pilot took off in what he admits was a "pretty good breeze" and shoved on up the coast to see what he could find of this missing husband. He scoured the seas all along the way, as far as Portland Lightship, and zigzagged back into various harbors and inlets to see if the boat was laid up anywhere. When he flew into Biddeford Harbor, there was the boat, safe and sound. Its occupants were waiting for the storm to subside . . . . and the word was soon relayed by this aerial envoy.



A Loening amphibion of the United States Coast Guard flying on patrol.

All that area gets a good deal of the bad weather that drifts in from the Tail of the Banks, off Labrador, which is notoriously foggy. And if this is bad for small boats, it is equally dangerous for airplanes. On one occasion, Lieutenant Melka was out on his patrol when he ran into fog. When he wanted to land, he found he couldn't see to do so, though he thought he was near the base. He radioed to his chief, "Where are we?"

Commander Van Paulsen radioed back, "We can hear your motor right overhead. Better try up north and see how it is!"

Melka headed north, but it was just as bad there. He then came back and determined to stick right around there if it took him all morning. After a time, he received a radio from the base, "Fog slightly lighter," and he continued to fly back and forth at around 2,500 feet as he waited impatiently for the fog to lift.

Finally he received another message from Van Paulsen, saying, "Visibility a quarter of a mile." With this cheering news, he decided to try to descend if he could locate a small patch that was any brighter. He managed to come in and land her right near the breakwater. But had he been far out at sea, or without a radio, there might have been a different conclusion to the flight.

During the time that the two famous French aviators, Coli and Nungessor, were due to reach America from their trans-Atlantic flight, both Commander Van Paulsen and Lieutenant Melka were flying in search of them in the midst of sleet, snow and storm. It was "snowing to beat the band" as the pilot put it, but these two Coast Guard fliers went out 200 miles at sea in their effort to find the missing men.

Soon after the organization of this unit, its value in locating rum ships was recognized as well worth any effort to keep the outfit going. The rum runners had formed the comfortable habit of having their ships lie offshore about 25 miles, where they were unloaded at their ease by small fast boats. Lieutenant Melka had discovered some eighteen or twenty of these ships on one of his earliest flights. Since there was no radio in the plane in those days, he recorded the names of the ships, turned back to the base, which radioed to the nearest cutter to attend to the "rummies."

Almost immediately, the Coast Guard officials began to realize what an asset that plane was going to be. Nor was their confidence misplaced, for according to the records of the aviation unit, some 75 per cent of the rum ships captured have been first located from the air.

The pilot was daily warned, cautioned and exhorted by his commander not to fly out more than twenty miles to sea, for there was no relief plane to go out for him in case of a forced landing. But as time passed, and the rum ship captains became more and more nervous about anchoring inside the 20-mile limit, Lieutenant Melka had a hunch that by flying out about twice as far, he would find twice as many rum ships. Moreover, he knew of a little shoal spot about 75 miles off a certain ledge. On the next fine day, he headed toward this rendezvous, and was gratified to find that his hunch was absolutely correct. In fact, there was a very large ship there, with cases and cases of liquor piled high on her decks and no effort at concealment at all.

At about that time, it was the practice of the pilot to fly over the cutters, and having flagged the captain and signalled that he had a message to deliver, pass down the message carrier. Captain Wheeler, in command of a cutter on duty in that section, became used to coöperating with the plane in this way, and as soon as it appeared, had a boat trailing astern of the ship to catch the message in. This was contained in a small square of cork, sewn in canvas and painted brightly in yellow. A hollow space was made and the note put in and corked up, and since it was light in weight, was not apt to injure anyone in falling. When the captain had received the message, he blew a blast or two on his steam whistle, and through Melka could not hear it, he counted the puffs of steam coming out for his answer.

One day, Captain Wheeler said he wanted to go up for a flight so that he could see some of the things they had told him about the game the speed boats were playing. The pilot took the plane up

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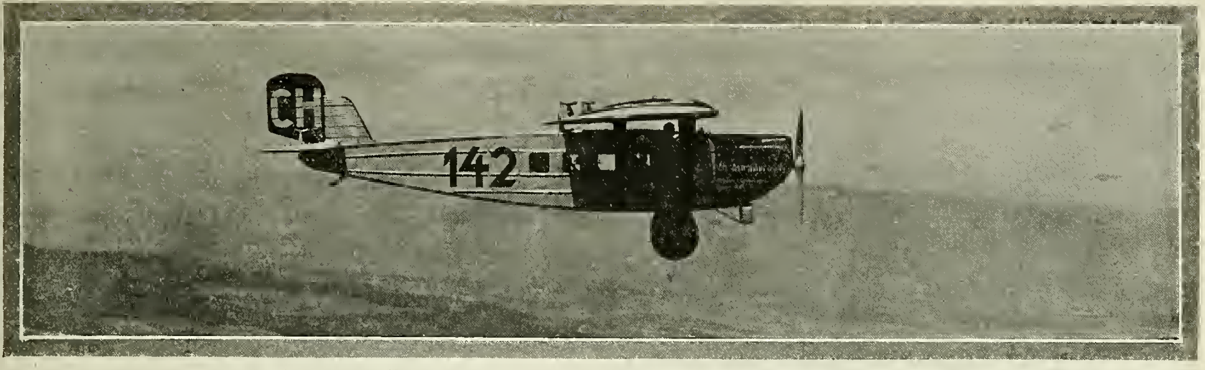


Dornier-Merker used in Swiss air transport service. CH is the symbol of Swiss aircraft registry.

EUROPEAN FLYING IMPRESSIONS

Based on a 3,600-Mile Air Tour Recently Completed

By Daniel Rochford

IF you've walked around inside the wing of a monster airplane without having to stoop; if you've watched them building passenger waiting-rooms and recreation promenades as big as half the Harvard Stadium bent straight; if you've talked to the pilots of a big tri-motor at London one day and found the same fellows clear out on the Russian frontier a few days later and clocked them into Vienna and Paris and realized that they fly every big route in Europe and that their comrades are doing the same trick; if you know European Diesel engines have flown successfully all winter; if you've toured airplane factories where there is one engineer for every ten workmen; if you've visited flying schools where boys have to pay only twenty-five dollars per month for their food, lodging, and flying instruction; if you've talked to sightseeing pilots who have been flying in single-motored airplanes out around the spit of the Jungfrau, Mont Blanc and down the canyons of the Alps for eight years with never a passenger casualty; if you've done some of these things, you're not going to come home from Europe in the summer of 1929 and say that America has bought everything Europe has in aviation.

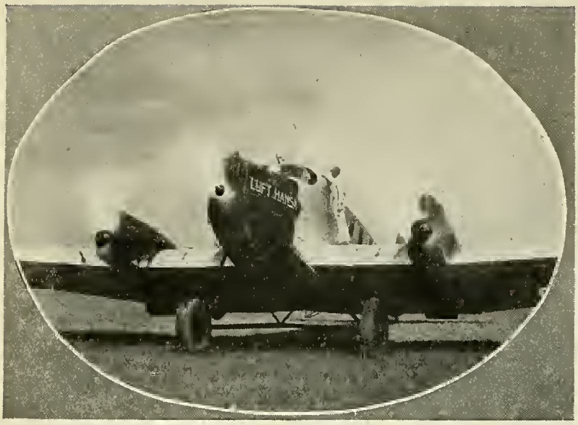
Going over on the boat in March, an Austrian war ace, now engineer at Junkers, said to me, "In America you have wonderful enthusiasm and tremendous aerial activity. But in design you are as little children." We pooh poohed him. A month later he showed us the new Junkers forty-passenger plane in the factory at Dessau. There was a fuselage as big as a railroad car. We climbed up into the wings, walked into them. We looked at the water-cooled engines, mounted inside the wings, huge thousand horsepower creatures which will drive air screws on shafts out in front of the wings. Over each motor, electric lights. Cut out one engine completely, overhaul it in flight, flying on the others. No air stream bothering the mechanic. Cool the same motor with this new lighter-than-water fluid. Air-cooled engines, he said, are no good in the power ranges above five hundred horses. Junkers has abandoned attempts to use them. With the protected engine inside the wing, air-cooling is out of the question anyway. We looked around the vast cabin which extends right into the wings. We apologized to him for disputing him on the steamer.

Tempelhof, Berlin, at night as a Junkers prepares to take off for Königsberg

When you stop to realize the number of great new planes they are completing in Europe this summer and the paucity of such pioneering construction in America, it makes you wonder. France has an airplane with wings you can walk through. The Handley-Page people in England have a new biplane with the passenger cabin below the bottom wing and with four engines, two between and two above. Dornier's new 12-engined flying boat, designed to carry 100 passengers on transatlantic service, is described on page 114 of this issue. In Paris we climbed into a new Blériot mock-up of a twin passenger-compartmented monoplane with engines above the wing and passengers below. We admired the great four-engined Rohrbachs at Travemundi.

At Dessau we talked with Chief Pilot Zimmerman and Pilot Risticz, world endurance record holders. "Are you not nervous about your first flight in the big Junkers?"

"No. We know what it will do. I have six other pilots here. All wish to make the first flight. All are capable." I mentioned how much I'd like to return to Germany to see it fly. "Oh stay where you are,



Junkers G.24 trimotor transport of the Luft Hansa

he answered, smiling, "We'll bring it over to you."

Faced by evidences of tremendous aviation development throughout Europe, one realizes, nevertheless, that America is sweeping along at a pace which is rapidly absorbing the best that Europe has to offer.

Go down and land on any big European airport and go into the hangars for private and sport planes. You find a surprisingly small number of little planes. Of course, private pilots are discouraged by a healthy landing fee, from using such fields as Croydon. But on the other hand, such chief airports as Switzerland's Dubendorf, principal military and commercial center, encourage private machines. The canton even maintains a hangar there and grants free storage. Down at Lyon, in southern France, we saw old early-war vintage equipment being flown privately, equipment which our inspectors would ground without a second glance. Cities of 300,000 population have three or four privately owned planes.

Travemundi, Germany

Vienna, Austria

It's a money question. Young fellows who can't afford to own automobiles are certainly not going to be sporting airplanes. If it weren't for the flying clubs which are supported by the communities and give flying at no cost at all or a nominal charge, the boys of several countries over there would not pilot power planes at all. The German glider schools charge the amazingly small sum of twenty-five dollars for the month including everything. Yet that sum is a tremendous obstacle to most young Germans. Even in England where private flying clubs have done best, they howl against the dropping of the subsidies, and many fliers oppose this new association of flying clubs which hopes to link England in an airport net, because it has a new form of subsidy the existing clubs have not.

There is where America has the advantage. Perhaps we are a bit too cocky about what our money can buy. But enough of it seems to be able to accomplish anything. We flew around Europe in the propeller wash of Clarence Young, so to speak. He rode his own plane, while we flew 3,600 miles on the various airlines. But his speeches had stirred them all up. Almost every pilot or radio man we talked with managed to get in a few questions about pay and promotion in the States. Over there a pilot is paid about $135 a month and five cents per mile and knows he is lucky. Here we even tell the newspapers that we have to pay our pilots $6,000 a year to ride around in trimotors.

Too many Americans judge European airlines by one ride from Paris to London. Or they see Tempelhof and come home and tell their friends that American airports don't know how to handle planes or weather services.

Naturally, you can't go to Europe in the spring during the bad weather and come home and expect your generalities to be without serious discrepancies. But nobody can put in forty hours in many types of planes and through various countries and not see a few things worth reporting.

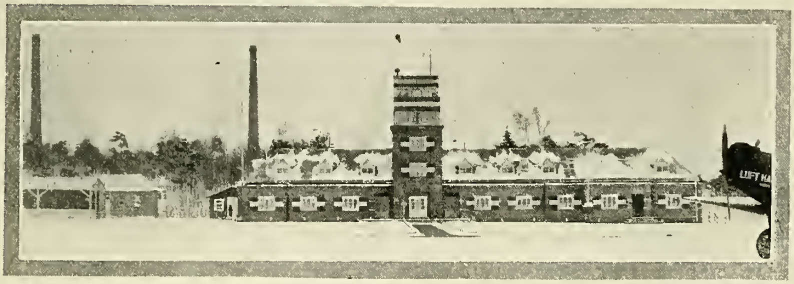
The American likes to have a cut and dried yes or no to his question. Is American passenger carrying as good as European or not? In point of service offered to the man who wants to go places by airplane, it is not as good as central Europe's, because we have not the many feeder lines on scheduled service. And further, it won't be as good, because, unless we adopt a government subsidy, we can't have the many short schedule flights they have in Europe.

Remember that the Luft Hansa, the greatest air system in Europe, earns

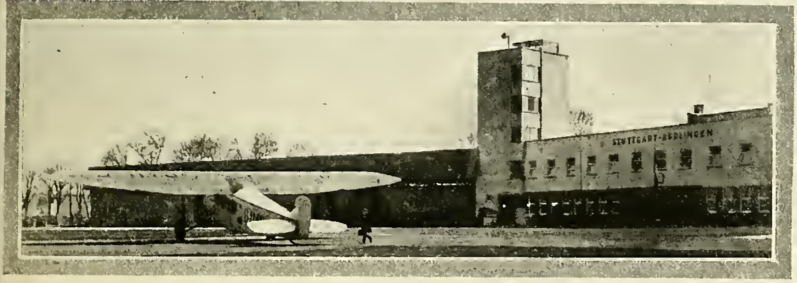
A group of hangars bordering Prague airport, Czecho-Slovakia about one fifth of its operating costs. Realize that the British, with an ideal run between London and Paris, were not able to earn more than about two-thirds of their expenses last year. Even the Swiss, who do charter flying out around the Alps earn only three-quarters of their costs.

Dubendorf, Switzerland

They don't beat about the bush over there when you talk costs. They admit that the feeder lines do not pay and never will. The Luft Hansa, for example, has three forms of subsidy. The central government pays on mileage of planes flying from a point inside Germany to a point outside. The provinces which correspond to our states, do similarly. The small cities and towns, which have perhaps one plane a day each way, split the mileage cost between them.



Dresden Airport



Control tower at Stuttgart, Germany. The plane is a Focke-Wulf

It may be argued that feeder lines will ultimately develop real traffic in America. Let us hope so. But they haven't done it in Europe. And even the main lines, with fares clear down where they touch whiskers with railroad fares, fly the run with almost empty ships days on days during the winter season. My wife and I had several rides as the sole occupants of ten and twelve-passenger planes. Too many Americans see European flying only in the summer when business is best and weather most favorable.

In point of air travel over what lines we have, America is just as good as, and in several ways, better than Europe. We're faster for one thing. I've flown many round trips between New York and Boston in Colonial trimotored Wasp Fords. They give you 125 miles an hour against Europe's 95. Bus facilities at terminals are excellent. A steward serves you sandwiches and ginger ale enroute, provided he hasn't forgotten one or both. You couldn't ask for a more comfortable ride.

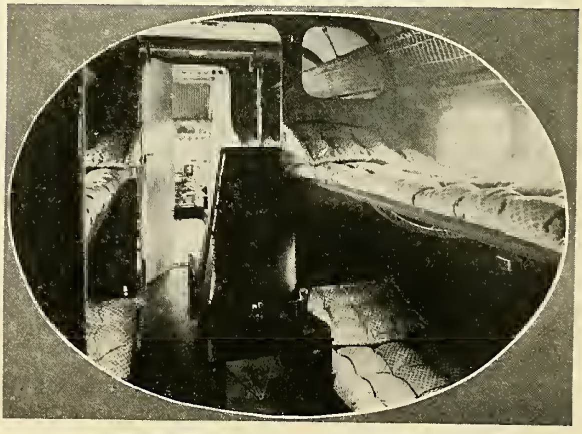
But Colonial doesn't weight its loads, yet. It's going to when some new hangars are built, but it doesn't today. Its ships don't have straps in the seats. They don't have a light at the front of the plane which flashes on as the plane is about to land and warns, "Fasten your seat straps; landing!"

On the other hand, Americans who had flown abroad had told me about the perfect weather system. And I sat in a single-motored plane whose pilot was fighting a blinding snowstorm for thirty minutes to get down, finally between the four towering smokestacks which make Dresden's airport such a comfort once you're on it. The weather system left us right where it leaves so many other airplanes, at the toss of your pilot's ability. If he knows his stuff, you get down the way you want to. If he doesn't, you get down the other way.

One thing that shocked me was the absence of wheel brakes on the European airliners. Why, we were never able to learn. Some of the newer ships are coming out with them.

Nor are the European inspection systems superhuman. We had a good wait after starting time at Copenhagen while they pulled some bad plugs. The human factor remains the same no matter what sort of inspection systems you install.

We mentioned Paris to London. A ride over that route would be better in monoplanes. Those multi-motored biplanes cut off your visibility below and give you all the noise. The high-wing monoplane is best for passenger visibility, but the engine noises are thrown down into the



Sleeping berths in the cabin of a Junkers G.31

cabin. The low-wing monoplane is better for eliminating noise, but not quite as good for visibility.

Frankly, that low-winged Junkers impressed me more than anything else in Europe. I clocked the Junkers single-motor and trimotor in flight, load for load, against such high-wing monoplanes as the Dornier-Merker, Fokker and Foeke-Wulf. The low-wing, because of the rolling cushion of air close to the ground, took off every time from five to twelve seconds more quickly, requiring from seven to thirteen seconds as against from eleven to twenty-two seconds, load for load.

The low-wing as developed by Junkers should be carefully studied in America. If, as it seems, it can get off more quickly and it slows up much faster as it approaches the ground to land, those are tremendously important recommendations. And it has a wonderful safety argument in the fact that the big metal wing is beneath the cabin and in ninety-nine out of a hundred crashes the wing would wash out first, sparing the cabin.

Speaking of airplane noise, there is food for thought in what Maxim found out up at Hartford a little while ago. He has developed some new air-plane engine mufflers. He sent a sound engineer up with Harry Copland, and they muffled the engine noises almost completely. They found that the strict engine noises are only about one-fifth the total airplane noise. And they found too, that most airplane noise comes in through the floor of the plane.

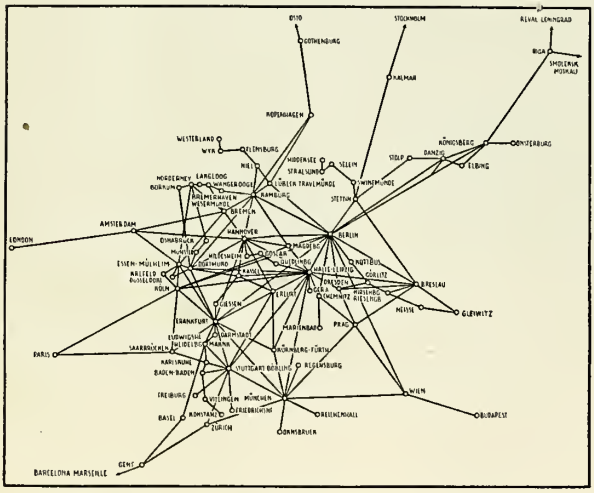


Diagram of the airlines emanating from Germany

Our weather and radio reporting service is fast reaching satisfactory growth. Europeans have been using radio on their bigger planes and have the thing down so well that, during a flight over from Holland to Hamburg, we climbed up above two cloud levels and at 8,000 feet got a radio check of our exact location within a few minutes of our inquiry. Flying into Danzig one afternoon through localized snowstorms, we were told by radio to go beyond the south of the city and then swing back in from the sea behind snow. We did and got in nicely. At Croydon they showed us how they can bring a plane right in over the field in fog. But the sets in the planes weren't held out to us for personal radio telephone conversations with towns on the course.

The Europeans have done a good stunt for passenger insurance. The various lines are formed into an international union. Seven per cent of every fare collected is paid into an insurance fund, and from this, stated sums are paid for injuries or casualties. The Germans made this insurance compulsory. The French offered it, but did not require it. The Swiss, English, Austrians, Dutch, Scandinavians, and Russians followed the Luft Hansa lead.

Lympne, England, as seen enroute from London to Amsterdam

Terminal airports, as might be imagined where governments aid with such subsidies, are large and excellent in Europe. I had never dreamed of such huge buildings as those of the enlarged Hamburg airport, for example. You could build a second story inside the great hangars and double their capacity. The waiting room and offices tower five stories and stretch across the whole side of the field. The fields themselves are turfed and have wide paved or hard surfaced areas joining hangars and, in some cases, even extending out as runways into the field. Dessau has a 3,000-foot paved take-off strip with a mile or so flat field beyond it. There they will launch the new super-Junkers. Danzig has two strips on different sides of the field.

The motor starting was also interesting. Compressed air in cylinders is wheeled out and a speedy hose connection made and "presto" she roars.

A conspicuous feature of German airports were the police with flags standing out on the field. They have a great number of men standing around doing jobs which other airports leave undone. Practically all airports in Europe use a man in the observation tower to flag planes onto and off the fields. Sirens are sounded as planes come in to warn craft on the ground. And planes taking off must get the "all clear" signal from the tower. But the Germans also have men on the field where you turn your plane for the takeoff, and they flag you away like an auto race official.

The Germans are very honest about their Luft Hansa. They admit candidly that "we have no military aviation so we must develop the Luft Hansa." That explains why the pilots are sent around the circuit to learn all European airways. That explains the generosity with numbers of

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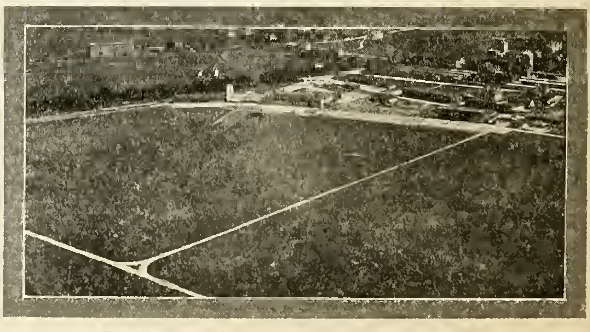


Doblingen Airport at Stuttgart, Germany

THE BIG IDEA

By Don Rose

As far as I am personally concerned, this aviation business has got out of hand. I can't keep up with it or catch up with it. It's become as difficult to concentrate in aviation as it is on the Jersey beaches on a warm Sunday in August. There's too much to look at.

Before I have had time to absorb and digest an endurance flight, somebody is off on another, and in the meantime somebody is hopping the Atlantic and somebody else has gone up to pull the nose of the man in the moon. I'm in the same tough way when it comes to technical achievements. Before I have made up my mind which is the top and which the bottom of the autogiro, somebody builds a three-story flying boat with twelve engines or an automatic parachute which works while you sleep. It's all very unsettling to a man who likes to take his aviation seriously.

Sometimes I'm not even sure whether aviation is a game or a business or a three-ring circus or a scientific experiment. There is, of course, a great deal of scientific experiment in it. Endurance flights, for instance, have nothing to do with business or the price of gasoline or the shortage of acrobats on the vaudeville circuits. They are scientific experiments, designed to determine whether a man can outlast an engine or whether a pilot's head will crack before his cylinders. At least, I suppose they are.

Such scientific experiment is absolutely essential to progress, and all of us can and should contribute our little mite to it. I have myself conducted a number of endurance tests of the utmost scientific importance. I could tell you something about the staying powers of certain pilots in conflict and competition with light wines and beer. I might mention the non-stop poker game which started one foggy Friday in Philadelphia and lasted until the wind changed on the following Tuesday. But it is in the domestic sphere that I have made my own chief contributions to the advancement of civilization and the demonstration of the superiority of mind over matter.

The endurance tests to which I refer were intended to establish a record non-strop performance with a single safety razor blade. My record is eleven and a half shaves. I don't say that this achievement will stand for all time, but anybody who beats it has got to have a tough hide. It took me a long time to reach it. My first test broke down on the third shave, when I mistook the tooth-paste for the shaving cream and the razor immediately broke out with pyorrhea. I started again and reached the fifth shave before my wife borrowed the razor to scrape some paint from the parlor windows. I took up a collection from the bystanders, bought another blade, and started all over again.

On the third attempt I reached the seventh shave before engine trouble developed in the razor. Something fell off and rolled under the bathtub, and according to the rules and regulations of endurance flights like this, any contestant who allows the soap to dry on his face is disqualified. On the next attempt I passed the eighth shave with only minor cuts and scratches, and then broke out with poison ivy. There followed two attempts which failed because of bad blades and one that went blooey when the shaving cream clogged and began to spurt through the sides of the tube. And then came my triumph.

I passed the sixth shave, the seventh and the eighth. On the ninth I was a little nervous and cut myself here and there, but got through with it, aided and encouraged by my loving wife and by the cheers of the neighbors. On the tenth lap I took special precautions, rubbing my face down with holystone and soaking the whiskers in linseed oil before taking off. For the eleventh I tuned the razor with special care, oiling all its joints and streamlining its corners with a touch of cold cream. I noticed that it was beginning to miss here and there, and some of the older whiskers just laid down before it and jumped up again when it was past. But in a dim light it would pass for a shave, and the judges allowed it.

On the twelfth shave the going began to be pretty heavy. Visibility was poor, owing to the extra amount of soap needed, and my face was getting pretty bumpy. I lost a few pieces of skin-fabric on the turn but made a pretty loop over the upper lip which brought a lot of applause from the crowd. Then I started up the other side. But perhaps I was a little over-confident and too anxious to be through with it before coming down with pernicious anemia. I forgot to allow for the natural flow of my whiskers, and turned the razor right against the current. The blade snapped, curled up at the edge and crashed out. I fell back into a bottle of witch-hazel and the arms of my waiting wife, exhausted but triumphant. Man had outlasted machinery again.

Now I am waiting to hear from King Features or any of the other syndicates. I can also offer some very attractive testimonials to a variety of razors, soaps, liniments and lotions. If the manufacturers come across the way they should, I'll never shave myself again.

This personal experience in record-breaking ought to be sufficient evidence that I don't mean any real harm when I say that this latest crop of endurance and altitude flights doesn't register as well as the last one. My own imagination and enthusiasm have been stretched so often that they have lost a lot of their snap. A record more or less has come to mean about as much in my young life as duck soup on Tuesday after duck hash on Monday and roast duck with stuffing on Sunday. There's no surprise left in them. If somebody went up in an airplane and stayed up forever, it wouldn't startle me much.

Everybody expected this to be a big year. But I doubt if anyone foresaw that there would be so much going on that a general impression would get abroad that aviation was just running round in circles and chasing its own tail. We did not anticipate that the public appetite for thrills and achievements might become overloaded and the public imagination a little bored by a show with too many acts.

Public opinion is more a matter of mood than of good judgment, and you can't quarrel with the customers even if you think them foolish. We ought to face the facts, if we can find out what they are. And it looks to the innocent bystander as if business is not keeping up with the ballyhoo. In comparison with the terrific record of aeronautical achievement during the past year, cash customers are still pretty scarce.

It is interesting to speculate on the reasons why there is so much air and so few people using it as yet.

Perhaps one reason is that there has been so much put in the show-window that nobody bothers to look inside the store. These spectacular performances that rate a place on the front page of the newspaper have put up a sort of smoke-screen, through which it is pretty hard to get a look at the more solid, sober and substantial achievements of our industry. The nose for news follows the trail of the record breaker but misses the quiet accomplishment of some aeronautical enterprise engaged in regular business. There are ten thousand people who can tell you the name of the last stunt flier who broke his neck,

(*Continued on page 244*)

AIR-RAIL AND THE T.A.T. SYSTEM

By
Francis D. Walton

THE definitions of the new term "air-rail" are legion. The professional after dinner speakers, the kiwis and the modocks (An Antique by Cy Caldwell—Editor's Note) are already beginning to pound the term into an unintelligible pulp. There will be at least as many explanations of it as there are commercial, technical and economic viewpoints on what results from the combination of air and rail travel. The railroad man sees it as a method of speeding transcontinental transportation; i.e., the reduction of distance beyond the terminals of his own railroad. The traveler will see it as a novelty and a time-saver. The men in aviation are apt to consider it first of all as a signal victory, which ended in a truce where the graybeards of railroading have sued speedily for peace with what might have proved to be an everlasting and always dangerous rival. The theoretical transportation expert and the traffic men may be inclined to dub it an experiment. And when all of these definitions are taken together and shaken down, air-rail would appear to be one of the swiftest strides which the airplane has made into the domain of American commerce.

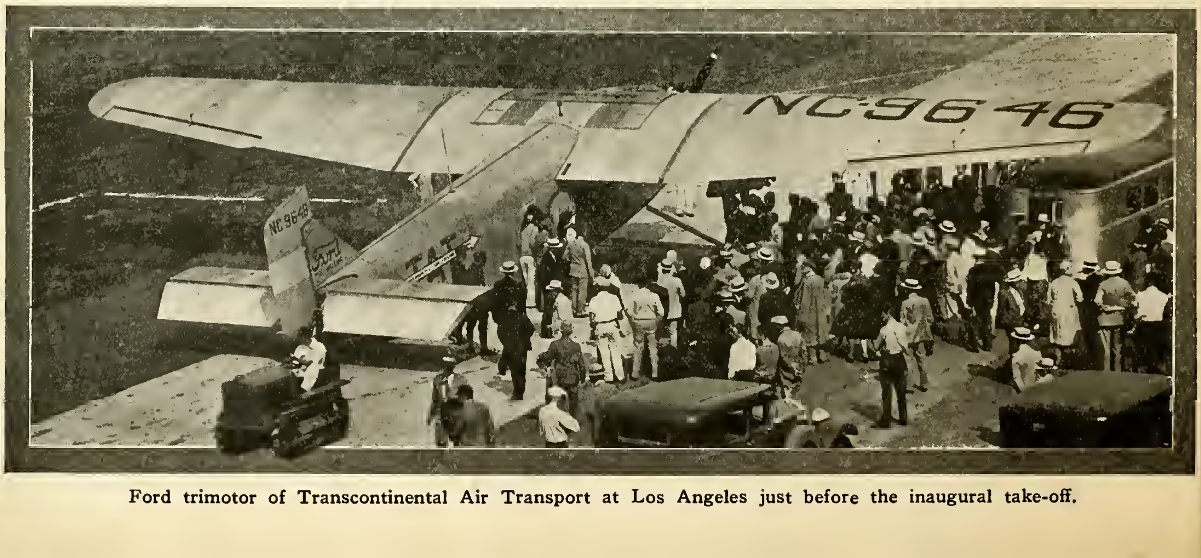
The historians of aeronautics in 1929 will, perforce, give much prominence to the sudden evolution of air-rail travel. It appears at this time the outstanding commercial aviation development of the year. On June 15 the Universal Air Lines, in conjunction with the New York Central Lines and the Atchison, Topeka and Santa Fe, began a sixty-hour coast to coast service. On July 8th, after a two weeks' period of preliminary trials, the Transcontinental Air Transport, assisted by the Pennsylvania and Santa Fe railroads, started a fifty-hour air-rail service between New York and Los Angeles. On this same day announcement was made of a new air-rail service by which passengers could be carried from coast to coast in forty-six hours. This system is to be established through the coöperation of the New York Central, the Santa Fe, and the Chicago and Alton railroads and the Western Air Express which flies straight through from the coast to Kansas City. These are but a few and the more recent of the air and rail projects. They are not the first. Almost every major railroad in the country now has a working agreement with some airline. Western Air Express alone has twenty-one such agreements with railroads.

The Transcontinental Air Transport is the line which has been selected for detailed discussion here, because it is both typical and paradoxically different from the other air-rail lines, in that it is the most complete integration of the train and plane into a wholly distinct and new organization and because the writer has had the opportunity of following the organization and development of this system more or less closely and was permitted to make a round-trip over the system at its completion and in the trial period of operation just before it was opened to the public.

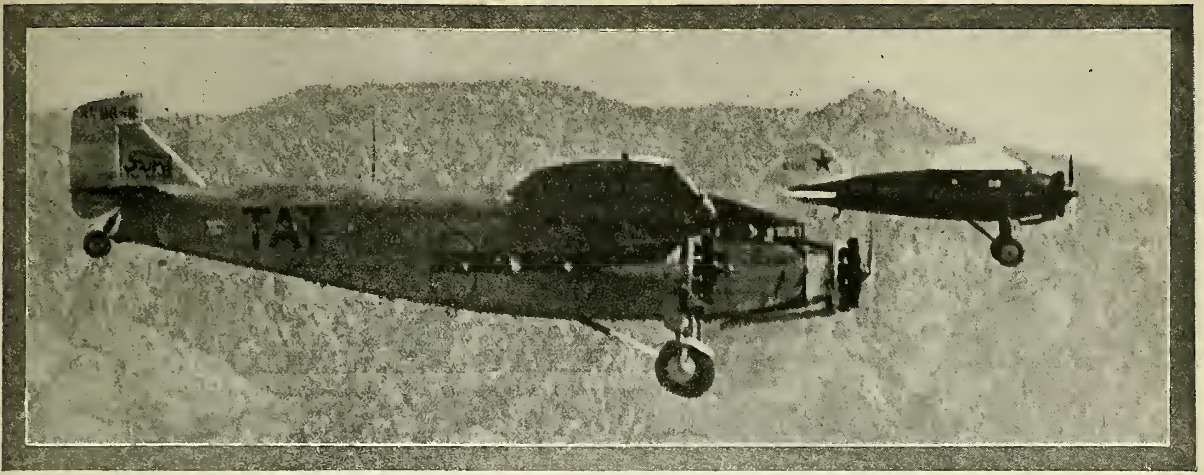
The conception of a great transcontinental system of transportation which would combine railroads and airplanes in a service to reduce by at least half the time required by an all-rail journey from the Atlantic to the Pacific Coast occurred in the dawn of the renaissance of commercial aviation in 1927. The idea was generally common property among persons who were then giving serious consideration to the practical employment of the airplane. Both on the East and West Coasts men in aviation were talking and discussing the problem. Then the railroad men, perhaps perceiving a little of the handwriting on the wall, expressed a willingness to get together with aviation leaders.

The Pennsylvania Railroad officials were among the first to establish relations with an important aviation group. After a period of preliminary discussions, a working agreement with the Curtiss-Keys aviation group was drawn up. The Atchison, Topeka and Santa Fe Railroad was then invited into the group to form the western rail link, and a new company known as Transcontinental Air Transport was organized.

The first announcements of the project were indeed impressive. Sufficiently so to float a considerable stock issue for original financing. In fact, the stock issue as a speculative investment, per se, turned out to be so attractive an affair that it seemed for a time that it might serve as an end in itself. But Mr. Keys and his associates put the task of building up the idea of air-rail into young and enthusiastic hands. The group of young-minded men



Ford trimotor of Transcontinental Air Transport at Los Angeles just before the inaugural take-off.



Col. Charles A. Lindbergh piloting the first eastbound T. A. T. Ford, accompanied by a Lockheed Vega escort plane.

went to work on a herculean task with spirit and determination. The obtaining of airport sites, the selection and testing of equipment, the formation of flying and ground personnel, the coördinating of rail and air schedules, the building of air stations, air depots, terminals and weather stations—all of this was a mammoth undertaking, and as the ambitious date for an early opening was postponed from time to time, it seemed that the leaders were showing a willingness to allow the thing to remain forever a financier's dream. But such was not the intention, and with proper prodding at the psychological moment from the young workers and their active chief, Colonel Charles A. Lindbergh, who served the line as chairman of the technical committee, the system was at last reported ready for operation.

It was with a sense of high adventure, and perhaps a measure of skepticism, that a group of aviation writers and reporters for the New York metropolitan press left Pennsylvania Station in New York on the evening of June 26th for an inspection trip of the line under the guidance of Henry W. Conner, eastern traffic manager of T. A. T. Although it was not until the party alighted from the *Airway Limited* at Port Columbus, Ohio, the next morning that actual contact with the flying operations was made, the party had been aboard the train in a private compartment car but a short half-hour when they were given a demonstration of the interest which the new method of air-rail holds for old railroading hands. There came a knock on the door of one of the compartments, and the knocker was bid to enter. He was an elderly man who had grown old in the conductor's uniform of the Pennsylvania's crack train, the *American*. In manner he was extremely diffident as he presented to Conner, our host, an order from his division chief recommending that he make the air-rail trip at the convenience of the line. He said that he never had been up in a plane. He wasn't greatly interested in aviation itself, but this air-rail idea, now he just had to know about that first hand. Not only he had to know about it, but his two cronies, conductors on other crack trains of the Pennsylvania who between them had a total of 120 years of railroading experience, had decided to make the air-rail trip. When Conner assured him that he thought it could be arranged, he departed apologizing for the interruption and wished us a pleasant journey.

And a most pleasant journey we had. Criticism of air-rail did not wait until the opening to the public of this new form of travel. The godunks (Is Mr. Caldwell in the audience?) said that they didn't think that they would like this idea of changing from train to plane, and from plane to train. There is one word for such criticism. It is bunk. The outstanding characteristic of the old-fashioned all-rail coast to coast travel is monotony. Air-rail offers a pleasant escape from this. Also it might be appropriate to speak a word in answer to the rather dubious and questionable propaganda which is being circulated that one day of air travel is all that the novice plane passenger wants or can stand. That also must go out the window. The real advantages and comforts of plane travel cannot be fully appreciated in one day of flying. The second and third (if there was such on this new fast system) are progressively more pleasant. I believe I know whereof I speak regarding the comparative advantages of air-rail over all-rail transportation between New York and the Pacific Coast. I have made five trips by the all-rail method and one all-air. The combination, considering all the features, is by far the most pleasant. Our party also included two persons who gave us the air novice's viewpoint. One had never flown before. The other had never done any extended flying. There was only one case of air-sickness, and it did not develop beyond the incipient stage, despite the fact that we had a fair share of the usual bumpy weather over the Middle West.

We left the train at 7 o'clock in the morning at Port Columbus, a new station stop on the Pennsylvania line eight miles from Columbus. This is a modern air station, located on a splendid field, which has been brought into existence to meet the special demands of air-rail service. It was at this station, located just across the road from the railroad depot, that our party first came into contact with the extensive work projected and the work accomplished by T.A.T., and it was truly impressive. The hangars were of the best, the runways in excellent condition. The attendants were all in uniform, and everything proceeded in the most orderly manner. "Maybe now," was my first thought, "we'll be hearing the end of talk from all of these Europe-mad Americans who keep coming back and telling us, in so superior a manner, how much better they do these things in Europe!"

It was at Port Columbus, too, that we met the first of that remarkable corps of pilots which has been mustered to operate the trimotored Wasp-powered Fords of the T.A.T. There are thirty-four pilots in the corps, and I do not know of a more impressive or upright group of young men anywhere. All of the first pilots of this group have had at least 3,000 hours in the air, and of this total at least 500 has been on trimotored planes. The pilots have been assigned in as far as possible to the particular (*Continued on page* 250)

The Crowd at Old Orchard Beach, Maine, just before Williams and Yancey took off on their successful Atlantic flight. *P. & A. Photo*

RECENT SPECTACULAR FLIGHTS

By Robert B. Renfro

PUBLIC interest in flying has been keener this year than at any time previous, except when Colonel Lindbergh made his immortal flight to Paris in May, 1927. A rapid succession of spectacular flights in 1929 has done much to alter the layman's thoughts so that he is no longer simply half-curious; he now has a desire to participate. Although he may not yet be ready to adopt the airplane as his principal means of transportation, he is anxious to experience the sensation of flying in short hops from his local airport. And, once he goes up, he becomes (whether he realizes it or not) a very probable patron of the airlines a short time hence.

Although this attitude arises somewhat from a growing knowledge of the real safety of the modern airplane, attested by millions of miles of reliable airline operation, it is partially the outcome of successful flights which are more or less dramatic in character. In fact, it is the most obvious result of such flights, but by no means the most important outcome thereof.

Quite often, however, as much value derives from unsuccessful flights as from those which attain their original objectives. In the several transatlantic attempts this season, this point has been amply demonstrated. The creditable flights of the *Pathfinder* and the *Yellow Bird* across the Atlantic Ocean were less significant in some respects than the frustrated effort of Major Franco and his companions in the Dornier-Wal, *Numancia*, which is discussed later in this article. We omit details of the flight of the French Bernard monoplane, *Yellow Bird*, since they were fully covered in the July issue of AERO DIGEST and since they closely parallel those of the Bellanca, *Pathfinder*.

P. & A. Photo

Lewis A. Yancey, right, helping fuel the "Pathfinder"

On July 8th at 8:49 a.m., Eastern Daylight Time, with Roger Q. Williams as pilot and Lewis A. Yancey as navigator, the *Pathfinder* took off from Old Orchard, Maine, to fly to Rome, Italy, an estimated distance of 4,700 miles. Because of the prospect of favorable tail winds, the fuel load was reduced at the last minute from 500 to 450 gallons, which of course made the take-off easier. After flying continuously for approximately thirty-one and a half hours and covering 3,400 miles, the Bellanca monoplane landed at Albericia Aerodrome, four miles from Santander, Spain. Shortage of gasoline brought the ship down before it reached its proposed destination. It landed only a short distance beyond where the *Yellow Bird* was forced to descend for the same reason.

Next day the monoplane flew to Rome, where Williams and Yancey were received with a tremendous ovation.

Disregarding the mishaps and delays of the *Green Flash*, in which Williams and Yancey originally intended to fly the Atlantic, let us consider what these facts indicate. More than anything else, both the *Pathfinder* and the *Yellow Bird* emphasized again that, given fairly favorable weather conditions, the modern airplane is fully capable of spanning the Atlantic nonstop. The former plane demonstrated once more the well-known quality of the Bellanca design and the Wright Whirlwind engine. (Whirlwind engines have been used in six of the seven successful eastward crossings by American planes, and Bellancas have crossed twice.) The presence of the American fliers in Rome has probably served to strengthen Italian friendliness toward us. Indeed, therein lies one of the greatest benefits of the flight. Knowledge of weather conditions over the

Atlantic will probably be augmented, since Yancey is a skilled meteorologist and navigator, and ought now to be able to make some further important contributions to those sciences.

Although the *Pathfinder* was equipped with no radio, the fact that the French plane carried one suggests some interesting thoughts. Because ships at sea did not know when to expect radio signals from the plane, too few established communication with the *Yellow Bird* to determine its location with useful accuracy at any time during the flight. If the plane had suddenly been forced to descend, the duration of its S O S would probably have been too brief for a ship's radio operator to locate the plane with his direction finder. It seems plausible, therefore, that a system should be devised by which ships at sea could expect radio messages from a transatlantic plane at regular intervals and at a designated frequency and thus know its approximate location at all times. Then, in case of an emergency, it could be found more easily.

Since the question inevitably arises in this connection, it is appropriate to ask, did either the *Yellow Bird* or the *Pathfinder* increase the possibility that we shall soon have regular transatlantic flight schedules for mail, express and paying passengers? Yes, somewhat; all such flights do.

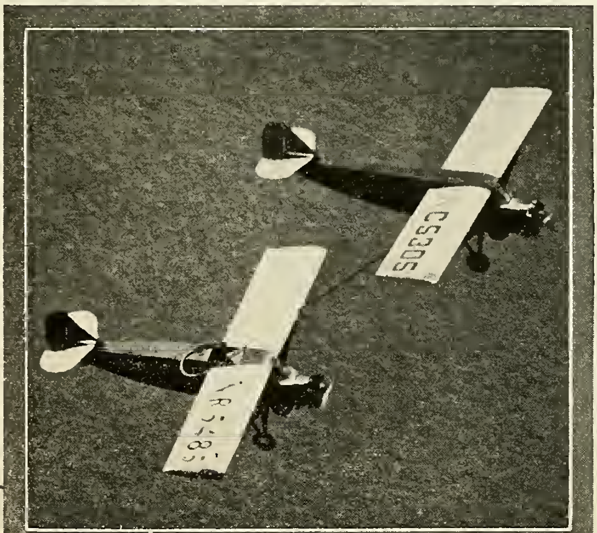
Yet experiences of Major Ramon Franco are perhaps a more important contribution toward that end. The fact that the Dornier-Wal remained afloat on the open ocean for a week before rescue came is an incontestable argument for the flying boat. Despite consistently rough seas, which on June 27th raged all day with particular fury, the hull of the Dornier proved absolutely seaworthy. When one considers this severe test of the seaplane, the use of landplanes for trans-oceanic flying appears extremely hazardous, even foolhardy. When airplanes are put into regular service across such great bodies of water as the Atlantic, they undoubtedly will be huge flying boats, more navigable on the sea's surface, with far stouter hulls than the present ones, and with from twelve to twenty engines. The first plane to approach this type is the new 100-passenger Dornier Do. X., powered with twelve Hornet engines, which was test flown in Germany in July.

In mentioning pioneering flights between Europe and America, we can not disregard the two attempts this year to accomplish the passage by the northern route,—Canada, Greenland, Iceland and Scandinavia. Both Parker Cramer in the *‘Untin’ Bowler* and Ahrenberg in a Junkers met with unforeseen difficulties. But their misfortunes do not disprove the feasibility of the northern route, and it may be that, with an enlarged knowledge of conditions in that region, regular flying can be established across it.

Captain Frank M. Hawks

Transatlantic fliers this year, however, are greatly outnumbered by those hoping to break the refueling endurance record. Indeed, refueling flights have become a current fad, undertaken by commercial pilots in every part of the nation and backed by nothing much more than their determination and the enthusiasm of the local populace. And therein rests both the strength and the weakness of these attempts. Undertaken individually, these endurance flights have utilized standard commercial equipment, usually slightly revamped for the immediate purpose, and have put it through the crucial test of protracted service. Many of the planes and engines already had had many hours in the air before they began their long endurance grinds; rarely were new or specially built planes used. Those which stood up under the strain attested adequately to the high character of their construction; those which failed defined more clearly what weaknesses need correction. If the causes of the breakdown of engines and planes in these long flights can be studied first hand by competent persons, we may rightfully expect the elimination of many faults and therefore a general progression in design.

Since May, the record has changed hands three times. Still one of the queries which the Army *Question Mark* sought to answer in January remains an uncertainty. What is the ultimate endurance of the modern airplane? Since Robbins and Kelly in the *Fort Worth* finally landed because of accidental damage to the propeller and not because of human exhaustion or inherent weakness of plane or engine, their experience added some enlightenment but did not give a final answer. When Roy Mitchell and Byron Newcomb brought their Stinson, *City of Cleveland,* to earth after 174 hours and 59 seconds in the air, their plane and engine were still in good condition. Loren Mendell and R. B. Reinhart remained aloft in their Buhl Airsedan, *Angeleno,* for 246 hours, 43 minutes, 2 seconds and finally landed because of tail flutter resulting from accidental damage. The question of the absolute endurance of flying equipment will have to be answered by future flights.



Refueling the Stinson Monoplane "City of Cleveland".

Although refueling flights conducted locally are of great value, we can expect much greater benefits when they are carried out on a national scope. Wherever these attempts have been made recently, two men have flown day after day over the same place,—Robbins and Kelly over Fort Worth, Mitchell and Newcomb in the vicinity of Cleveland, and Reinhart and Mendell near Los Angeles. The present record-holders, in the Wright-powered Buhl, covered an estimated distance of 19,760 miles at an average speed of 80 miles per hour. But all these figures will mean much more when they can be converted into airline distance. The Army Air Corps is the only group which thus far has made practical application of refueling; e.g., refueling of bombardment planes on long-distance missions during the recent Air Corps maneuvers. To demonstrate its commercial practicability is the next logical step. Refueling ought to be utilized for flying from coast to coast across the continent, where all the conditions of practical flight would be encountered. Such experimental flights, plus an increased average speed, would comprise a decided progression toward a desirable transcontinental non-stop transport service.

Individual, local enterprise would, of course, be inadequate to accomplish this. It would require more complete organization and stronger financing, which only an airline operator, a large manufacturer or the Government could furnish. But it would fully justify the effort and expense involved in an undertaking of this character.

Non-stop transcontinental flights by refueling are more adaptable to commercial purposes than non-refueling flights because they permit of greater pay loads. Their potentialities do not in any way detract, however, from the tremendous significance of Captain Frank Hawks' one-stop flight from New York to Los Angeles and return. Although Captain Hawks used a standard commercial ship, the Wasp - powered Lockheed Air Express, his flight is perhaps more important to military than to commercial aeronautics. His performance has given us some idea of the potential mobility of our air force. Assuming that both our coasts were under attack at the same time and that a heavy offensive were suddenly launched in one sector, an air force which could be assembled quickly by sending large squadrons non-stop from all sections of the country would be of inestimable value. Captain Hawks and others have shown what possibilities exist in that respect. The Army Air Corps, recognizing the military value of such a flight, had already assigned Captain Ross G. Hoyt to undertake a similar round-trip coast to coast flight. When Captain Hawks made the remarkable time of 19 hours, 10 minutes, 32 seconds for the East-to-West trip and 17 hours, 38 minutes, 16 seconds for the return flight (a total flying time of 36 hours, 48 minutes, 48 seconds), the Army cancelled its projected flight because its contention that the trip could be made in 36 hours was sufficiently proved.

P. & A. Photo

R. B. Reinhart and L. W. Mendell, who flew continuously for 246 hours

As we go to press, the refueling endurance record has been broken once more. The ship, in this instance, is a Curtiss-Robin powered with a Challenger engine which turns up 170 horsepower at 1,800 revolutions per minute. The *St. Louis-Robin,* as the plane is called, is being piloted by Dale (Red) Jackson and Forest O'Brine and, at this time, has been in the air more than three hundred twenty hours. The pilots contend that they will continue to fly until they reach the 500-hour mark.

Jackson and O'Brine, who took off from Lambert-St. Louis Field at 9:17 a.m. on July 13, established a new record when on July 23 at 5:00:2 p.m. they had been flying 247 hours, 43 minutes, 2 seconds, or an hour longer than Mendell and Reinhart had remained aloft. Immediately thousands of the air-minded citizens of St. Louis burst into an uproar of enthusiasm and celebration. Large crowds thronged Lambert Field; and escorted by two squadrons of planes, the *St. Louis-Robin* circled the downtown section while factory whistles sounded their congratulations.

This flight differs from other recent endurance attempts in that it is not an individual enterprise, but is sponsored by the Curtiss - Robertson Airplane Manufacturing Company, which concern produces the Curtiss-Robin monoplane. What factors will eventually cause this plane to land are still a matter of conjecture as this is being written, and, therefore, the full significance of the company's direct connection with this flight remains uncertain. Although reports are yet incomplete, it appears certain, however, that such backing has had some effect in this flight, for it undoubtedly has provided a more thoroughly organized ground crew and it afforded highly efficient facilities for servicing the ship before the flight. But whether or not this circumstance has had a far-reaching influence, the quality of the engine is undoubtedly the most essential element.

This flight becomes even more impressive when one considers that before the *Question Mark* made its flight last January the American refueling record was 37½ hours, made by Captain Lowell Smith of the Army in 1923. Unless something unforeseen occurs, the *St. Louis-Robin* bids fair to demonstrate, not only the high efficiency of the Challenger engine, but also the ultimate endurance of the medium powered aircraft engine in its present stage of development.

DEFINING THE RANGE OF AIRPLANE RADIO TRANSMITTING SETS

By J. E. Smith

President, National Radio Institute

WITH the purpose of measuring the field intensity of radio signals emitted from airplanes, the Bellevue Naval Research Laboratory is conducting a series of experiments which will afford a more accurate knowledge of the service area of aerial transmitting stations. The results of this research will serve as an index to the reliable communication range between one airplane and another, and between aircraft and ground radio stations.

The Radio Inspection Service of the United States Department of Commerce has already determined the reliable service range of at least 12 broadcasting stations. Some of the facts disclosed are quite surprising. For example, WSB of Atlanta, Georgia, which commonly rated as a powerful broadcasting station, is limited to an effective area of a few miles in a circle. Intervening steel structures cut down the field strength of the signals in certain directions. Similarly, the 20,000-watt broadcasting station WTAM of Cleveland radiates signals effectively over a considerable distance along the lake shore, but in a westerly direction encounters limitations which confine them to a distance of 10 miles.

The Bell Telephone Laboratories, Inc., have established the "complete service areas" for short waves or high frequencies. These field intensity measurements not only indicate the range of reliable coverage of high-frequency signals, but also show that certain frequencies have greater carrying capacity than others at particular periods of the day. These two factors have been correlated into what may be described as an efficiency table. That is, for the sake of supposition a wave-length of 40 meters is advantageous for use at 10 o'clock in the morning; whereas, a wave-length of 20 meters has a maximum carrying capacity at 4 o'clock in the afternoon.

The projected experiments of the Bellevue Naval Research Laboratory have for their purpose the defining of complete radio service areas of the air radio transmitting stations. The results will parallel the work of the Department of Commerce and Bell Telephone Laboratories in field intensity measurements of frequencies in the broadcast band and amateur band, respectively. The frequency range selected by the Naval Research Laboratory is from 3,000 to 8,000 kilocycles. Not only will the different frequencies be studied with respect to their maximum carrying capacity at different periods of the day, but the effect of various heights of the airplane upon communication efficiency will be analyzed.

The field intensity measurement apparatus used in these tests is located on the ground and the signals are being transmitted from an airplane flying at varying altitudes and at different distances from the receiving apparatus, up to 200 miles. In explaining the somewhat odd procedure of what seems to be putting the cart before the horse in locating the field intensity equipment on the ground, Lieutenant Commander W. J. Ruble stated, "If we can receive a signal from the test airplane in the receiving equipment on the ground, we know that we can send the signal from a ground station to the flying craft."

A portable field intensity measuring equipment, designed by the Bell Telephone Laboratories, Inc., is being employed in these pioneer experiments of zoning the transmitting stations of the air. The outfit is fairly compact and sufficiently rugged to withstand usage afield. The model used by the Naval Research Laboratory is a product of evolution—the result of modifications and improvements in which earlier designs have been discarded.

The Super-heterodyne circuit is employed. This equipment, both as a means of facilitating transportation afield and as a logical division, resolves itself into two units—the oscillator unit and the input unit, each contained in metal boxes. The oscillator is shielded, and a special container is provided for the power supply, which consists of dry-cell batteries.

The difficulty experienced with earlier designs of portable receiving sets for measuring the field strengths of transmitting stations was the variation in resistances of the loop or coil antenna when exposing the equipment to unfavorable weather conditions in service afield. It was, therefore, necessary to measure this resistance frequently each day, a task at once troublesome and time-consuming. The design used in the experiments being described is said to overcome this obstacle; a method having been devised whereby frequent calibrations of the loop antenna are obviated. The number of turns of wire and the shape of the loop antenna are not arbitrarily specified, but it is necessary to know the distributed capacity, the inductance, and resistance values of such a pick-up system.

A. G. Jensen of the Bell Telephone Laboratories, Inc., who designed this portable outfit for the Naval Research Laboratory, describes the new apparatus and indicates its true operating conditions as follows:

"The receiving set unit is a double-detection set provided with a sensitive meter in the plate circuit of the low-frequency detector, and the first part of a measurement consists in tuning in the signal to be measured and adjusting the gain of the receiving set so as to obtain a suitable signal reading on the detection meter. Next, the local signal oscillator is started and adjusted to the same frequency as that of the signal by zero beating, after which the loop is cut out of the circuit and the input shunt adjusted so as to give the same meter deflection as before, which means that the local signal voltage impressed upon the grid of the high fre-

(*Continued on page* 258)

Portable field intensity apparatus for testing the range of airplane radios

AIR—HOT AND OTHERWISE

Wise President Hoover—
Watch Out, Mr. Brown
Pernicious Propaganda
Gets Facts, Little One

By Frank A. Tichenor

WISE President Hoover wants a reduction in the cost of national defense. Nowhere in his announcements of intention to establish a "commission of Army officers within the General Staff" to "see what can be done" does he intimate that he wants an actual reduction in national defense. That, in fact, he does not want, nor does any other citizen of the nation.

A reduction in the cost of national defense would be a matter so simple as to seem almost childish if it were to be considered by men of high intelligence, whose lifelong mental habits never connected with the old forms of fighting. Mr. Hoover sees a probable rise to $800,000,000 in our costs if present plans are carried out. Present plans include all the old, vastly costly, infinitely cumbersome and now entirely inefficient fetishes. Doubtless his alert and businesslike mind revolts at the mere thought of such incredible spending, the highest that the world has ever known and the greatest that any nation now is making, with as a result only such devices in the main as modern experts ABSOLUTELY KNOW ARE USELESS—BATTLESHIPS WHICH COULD BE SUNK WITH BOMBS FROM ANY FOREIGN WOOLWORTH STORE AND GROUND TROOPS WHICH WOULD BE FIRST HELPLESS, THEN GASPING, AND IN A FEW MINUTES DEAD UNDER ANY ENEMY AIR FORAY WITH EXPLOSIVE BOMBS AND GAS.

What probably revolts the soul of that good business man who now sits in the White House is not the cost of our defense, but its futility. We have a shrewd conviction that he knows well what we are thinking of and that reasoning somewhat similar has driven him to his conclusions as expressed in his demand for a reduction of military expenditures. All that we have in our minds to suggest to him he probably already has done. But we will suggest it, just the same. Even if it does not help him, it may help others.

Anyone who is constructive minded, a patriot and a good business man, will be impressed, for instance, by the difference in cost between a comparatively small battleship and the largest and most effective fighting airplane ever built anywhere by anyone. Similar difference, and as emphatically in favor of the plane, will be found to exist in their potentialities of usefulness as defense instruments. It is our prediction, knowing Mr. Hoover, that he will urge his experts to produce a plan which will eliminate the mad extravagance entailed in the production of vastly costly weapons of offense and defense which are obsolete before construction and that then he will appoint another group of experts to suggest to this great nation wherein aviation had its birth a means whereby a comparatively very small expenditure might substitute the mighty waste which irks him, and much increase the safety of the nation.

WALTER F. BROWN, Postmaster General, like a new college boy, is standing at the threshold of much education. He told the newspapers not long ago that Government payments to air mail contractors must be generally reduced. At a recent conference with the contractors, he complained because the Government has had to make up deficits.

Postmaster General Brown is well known as an expert politician and from time to time he has been legal counsel for certain railway lines. It would give us a real heartache to believe that he would try to use his present great position for the benefit of ex-clients (we assume that he has utterly withdrawn from practice) at the expense of the financially as well as physically brave men who have given American business the tremendous and appreciated gift of the Air Mail, which serves them with such speed and certainty. Of course, we don't have any thought of that sort. We are of unsuspicious disposition.

But Mr. Brown seems to go on the idea that the air interests, unlike the farmers, have few votes, and therefore, that, although the farmers must be subsidized, the Air Mail must not.

You are thinking inefficiently, Mr. Postmaster General. As a matter of fact, Air Mail is far less important to the few operators and men who fly it than it is to the multitude of business men who use it. The air industry at present has comparatively few votes; but the business men of the United States, who profit by its service, have multitudes. Gradually mail is slipping from the railroads into the planes, and before long, Mr. Brown, the Government you happen for the moment to have the privilege of working for, will make a 2-cent Air Mail rate, being able so to do because all first class mail going 100 miles or more will be Air Mail. Railroads, Mr. Brown, will be too slow. Don't be too slow yourself, or you'll be left behind.

We would suggest to you, Mr. Brown, that you make a survey of your office assistants. Their previous experience in Air Mail matters may teach you very much. They have spent years getting knowledge which, were it cased in your own skull, would profoundly affect some of your conclusions. And among those assistants search not only for wise and honest helpers, Mr. Brown; search also for paid propagandists. The interests whose toes are bruised by the landing gear of Air Mail planes have money with which to purchase many things which hopeful minds may think are toe-protectors.

Should a reduction in contractors' pay be found necessary, each contractor should be dealt with separately, with some consideration for the service he has rendered, and some thought about his necessary overhead expenses. A contractor who is carrying a few salaries of $25,000 or more may be doing so because some names will have a fine effect on sales of stock to the investing public. Stock market booms and busts don't really affect air mail efficiency.

If, on the other hand, another contractor has operated without foolish overhead, it would be a nice thing, Mr. Brown, if you jotted down his name and number in your personal address book. A Faithful Servant Book was the invention of T. R. and worked handsomely. Why penalize a contractor who has rendered service to the Government by keeping his costs down? Let that man who has done well go ahead and make a living. And be glad, not sorry, if it is a good one.

You see, Mr. Postmaster General, the job that you have stepped into so gayly is full of complications. You are an honest and an able man. Don't be impulsive. Watch your own step, and if you allow anyone to lead you, be dead certain that you know where he is going to take you and for what real reason. If

(*Continued on page* 238)

GLIDERS TO COMPETE AT THE NATIONAL AIR RACES

By Lieut. L. F. Ross, R. A. F.

FOR the first time in the history of American aeronautics, primary gliders will compete in contests for duration, distance and accuracy of landing on a mark as a part of the ten-day program of the ninth annual National Air Races and Aeronautic Exposition in Cleveland between August 24 and September 2.

The eight contests which have been arranged include two events in which the gliders must be launched by the shock-cord method and four in which they will be sent off the ground by means of a tow rope attached to a moving automobile. There will be a derby limited to famous pilots of powered planes, the contestants in which will probably include Frank M. Hawks, holder of the west-to-east and east-to-west transcontinental non-stop flight records; Miss Amelia Earhart, of trans-Atlantic fame, and Reed G. Landis, second ranking American ace in the World war.

The list of donors of the first prizes is as follows: First event, the Cleveland *Plain Dealer;* second event, Halle Bros. Co.; third, Cleveland Auto Club; fourth, "Eddie" Stinson; fifth, the Cleveland *News;* sixth, "Cliff" W. Henderson; seventh, AERO DIGEST, and eighth, AERO DIGEST.

The prizes, consisting of silver cups and other suitable trophies with appropriate engraving, will be valued at at least $50 each.

These competitions have been arranged as a feature attraction for the 1929 National Air Races and are in keeping with the plans of Clifford W. Henderson, managing director, to make the Cleveland show as comprehensive and complete as possible.

This official recognition of engineless flight is significant. It attests to the growing interest in, and the importance of, motorless aviation as a sport and as a valuable adjunct to powered aircraft activity. It is destined to have a far-reaching effect, for it will not only afford glider designers and fliers an opportunity to test their ideas and give spectators the chance to see the first competitive flights, but will lay before the whole aeronautic industry the unlimited possibilities for growth in this particular field. The flights will perhaps surprise those who are unaware of the rapid development of this form of flying in the United States. It is likely, too, that if the contests are as successful as the sponsors have reason to believe they will be, glider competitions will become a permanent part of the annual air races.

Most of the world glider records were established in soarers, the third and most advanced type of glider. Although American glider enthusiasts are not yet prepared to soar, they are gradually bettering their performances in primary gliders. The Cleveland contests will show to what extent they have progressed since the introduction of motorless aviation in this country less than two years ago.

Lack of hills in those areas where enthusiasm has been aroused is no longer proving an obstacle; take-offs can now be made by launching the gliders with a wire attached to a moving automobile or motorcycle. Ways to launch gliders by the shock-cord method from a flat surface instead of the usual knoll have also been devised. It will be these methods that will be required for the contests at the Cleveland airport.

An allowance of ten cents a mile not to exceed a total of $100 for the transportation of the gliders will be given as an inducement for glider owners to take their craft to Cleveland for the events. A tent will be erected in which the gliders may be housed overnight, and soldiers will be assigned as

(*Con. on p.* 254)

International Newsreel Photo

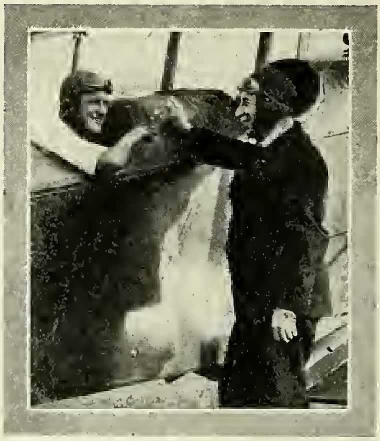
A primary type glider in flight near San Diego, California

A LAYMAN'S FLYING LOG

FORTY THOUSAND MILES WITH MORE OR LESS FAMOUS PILOTS

By Ralph W. Cram
Iowa's Flying Editor
of the Davenport "Democrat and Leader"

EVERYONE who flies, or intends to fly, should keep a log. And of course nearly everyone is going to fly, whether he intends to right now or not. I always intended to, although—don't tell anyone—it was several days after my 50th birthday when I had my first flight. That was almost exactly ten years before these lines will possibly appear in print. It has been a decade overflowing with happy memories of some 400 hours in the air, but a lot of them would be blurred and tangled if I hadn't kept a log. Therefore, as a chronic passenger in all sorts of planes, I advise every other passenger to keep a flying log, just as the pilots now have to, by grace of the Department of Commerce.


Ralph Cram (standing) and Freddie Carlson about to start on 3,350-mile trip.

If you do, there'll come a time when, in slippers and by glow of the evening firelight, you'll be grandly repaid as you turn its pages and recall the thrills you've had here and there, the sights you have seen, the fine pilots you have known, the red-blooded, air-minded folks you came to know along the way.

"Comrades of the air" is a term that comes to have particular significance to you. It ties you to those folks you cruised with on the Air Tour, or on a cross-state ride, a hop to New York or Chicago, or a combination rail and air ride across the country. It brings back again those scenes which flashed past below you on those daylight planes rides—a changeful panorama of farm and prairie, desert and mountain, rivers and lakes and forest, and clouds! Those rides above the clouds, tumbled by the winds and maybe pierced by mountain peaks.

As you con the flying log, you are thankful there was, and is, a lot of romance in flying, notwithstanding the overpowering movement to commercialize it. Of course it's a good thing to promote commercial flying—and you have helped—but no one must squeeze it dry and crowd out all the romance and adventure of its early days.

This writer thought that had nearly happened, until there came a demand for one more story, clicked from his typewriter—and the thought came: Why not give them my log?

It's just a layman's adventure into the flying game—one that has brought many choice experiences and many fine friends, as his horizon was broadened by the swift-flying airplane, and he took the advice once given him by General Mason M. Patrick, then Chief of the Air Corps—"Anyone who is going to write about flying ought to do a lot of flying himself."

So without further preface—here's a layman's flying log, of some 400 happy hours in the air:

The First Thrill

June 25, 1919. Up in a Canuck, with E. R. Johnson, civilian pilot, who had been flying from a clover field within sight of my home on the Mississippi bluffs, four miles from Davenport post office. (Made the front page of the Democrat with a column story on "Taking a look at Davenport from 4,000 Feet in Air".) Am on my way in Aviation, although I don't know where I'm going.

Season of 1920. Various trips off Wallace field, Davenport: pilots, Frank and Fred Wallace. Jennies. Took several hours' instruction.

A Cross-Country Trip

May 13, 1921. To Iowa City in late afternoon; start delayed by strong headwinds which cut our speed in half and made the old Standard rattle in every joint. Lights twinkling all over University of Iowa campus as we flew over it in dusk to air mail field. Five of us in Standard and Jennie, pilots Frank and Fred Wallace, Roy R. Fisher, Dr. Howard L. Letts, and myself. Next morning waited to greet W. C. Hopson, arriving at 9 with westbound air mail. Back to Davenport in half an hour with wind on our tail.

To Omaha Pulitzer

Oct. 31, 1921. Off in Jennie, Fred Wallace pilot, for Omaha Pulitzer race. Landed for gas, Iowa City, Des Moines, Atlantic. First visiting ship arriving, except special racing planes. Stakes down in far corner of field, which soon was bordered by war surplus crates. Saw Bert Acosta win Pulitzer in Curtiss Navy racer at 176.7 miles per hour.

Nov. 5, 1921. Back to Davenport in four hops, faithful Jennie stopping for fuel as above, in reserve order.

Aug. 5, 1922. Aloft with Frank Wallace, pilot, in Curtiss Oriole, latest colorful addition to flying equipment at Wallace Field.

The First Immelmann

Aug. 19, 1922. Wow! I'm still here, up in Jennie with Fred Carlson, pilot. Fred has just learned to do Immelmanns. Did two with me.

Aug. 26, 1922. To Monmouth, Ill., in JN 4D with Fred Carlson, pilot, for breakfast with Shirley Short and I. F. Dains, wealthy backer of flying activities there. Back to Davenport in time for church. Took over stick for part of trip.

Sept. 8, 1922. First ride in Laird Swallow, "Cactus" Brierly, pilot.

Sept. 24, 1922. Aloft with Brierly for flying visit to Moline field and return.

To Detroit Pulitzer

Oct. 4, 1922. Off with Fred Carlson, pilot, for Pulitzer meeting at Detroit. New motor in our Jennie in place of faithful old one that pulled us to Omaha last year. Cursew! Made Chicago 150 miles, in six hops. Engine missing, landed in five pastures without denting a cow, busting a fence or scratching the ship. Fred knows the barnstorming game. Final repairs at Checkerboard fixed us for Detroit.

(Writer sat in conferences which resulted in forming the National Aeronautic Association at Detroit meeting, and was one of about ten signers of its charter.)

(*Continued on page 272*)

AERO DIGEST

Published Monthly
THE AERONAUTICAL DIGEST PUBLISHING CORPORATION
220 WEST 42nd STREET
NEW YORK

Vol. 15 AUGUST, 1929 No. 2

MORE PLANES THAN PILOTS

AMERICAN manufacture of planes soon may outstrip American manufacture of pilots, but this should not lead youngsters to believe that a few vacation or spare hours in the air will fit them for these good jobs.

America needs trained fliers, but they must be *well* trained—*fully* trained!

Let every youngster ambitious to become an aviator paste that on the rim of his goggles and make his plans accordingly.

AERO DIGEST wishes to stimulate ambition, to emphasize opportunity and to paint aviation's facts attractively, but it must be accurate and fair. Even partial training will harm no competent youngster and money paid to a good school for honest and skillful instruction with good facilities will not be wholly lost to an ambitious youth even though the training does not carry him to the possession of a license. But to disappoint a youngster with misrepresentation is utterly inexcusable.

All air mail pilots and transport pilots must have had 200 hours in the air before getting places in the service, and employment on this minimum has been and will be rare. Therefore, youngsters wishing to be sure of enough experience to make "landing a good job" reasonably probable must either own their own planes, have funds with which to take postgraduate work, or get ground jobs on fields or with aviation companies likely to offer opportunities for obtaining the vital training opportunities at chance moments. Ground experience and other workaday training are valuable adjuncts to "air hours" and may help youngsters get them. But the chances of exactly the right sort of job at the right sort of factory or airport are not brilliant or common.

AERO DIGEST has no wish to be discouraging to American youths ambitious to get into the air game; but it warns ambitious youngsters that their aspirations in this field, as in all others, must be of the sort which can endure hard knocks, which will stimulate an almost desperate search for opportunity to achieve competent training and which positively will not accept discouragement. Demand, as we have said, very soon will exceed supply, but even the surplus chances will not be for the youngster who is afraid to work, study, strain manfully and often scheme with supreme ingenuity to deserve them.

We are intensely anxious to be of service to ambitious youngsters yearning to be fliers, and those who are "right" mentally, physically and psychologically will win in this as in other fields.

Among those procedures which will assist our usefulness, we have decided, is the refusal in the future (which we hereby announce) to accept advertising from any flying school which has not at least made application for a Department of Commerce rating. These regulations are such as can be met by every school that really is worthy of trust. No doubt they will be changed from time to time, but under present conditions they are intelligent and fair, and operate for the protection of the industry, the public, the pupils and the schools themselves.

With the clause concerning applications, however, we find fault. It says: "A school which has been disapproved for an approval certificate may re-apply for such rating at any time after the expiration of ninety days from the date of such disapproval."

We believe the Department will see the advisability of an immediate change in this clause. A school which has been disapproved and the owners notified should not be required to tie up its investment for three months when in all probability the necessary changes could be made in much less time. Any school which proves its willingness to meet the demands of the Department should be approved immediately it has met them. We want only the best schools, naturally, but discouragement of those willing to strive toward the highest of excellence will not help the nation to meet the approaching shortage of trained pilots.

INTERNATIONAL FRIENDSHIP

AS this is written the Kellogg-Briand pact seems to have smoothed out a serious wrinkle in Asiatic international relationships, although it originated in America and fructified in Europe. In other words, as far as such things are concerned, the world is shrinking. Aviation has done as much as anything to bring this about, and its work in that direction has only barely begun.

It is not mere high speed transport which is responsible for the airplane's efficiency as an instrument for peace, however. This matter has many facets.

Perhaps the first to show was the super-efficiency of the plane in warfare, which many think will make conflict so quick and terrible in its disasters that mankind instinctively will avoid it in sheer horror. But to try to prevent men from fighting by making them afraid to fight is to exercise a negative influence. Men always dare.

Not fear but familiar friendship is the positive influence for peace, and along this line the plane's potency already is great. What one episode ever did as much for international friendship as Lindbergh's flight? What has accomplished so much for Pan-American amity as the same splendid flier's South American good-will journey, during which he blazed the trail for mail and other practical service which already has begun to operate?

Every American flier who has fully or even partially succeeded in a trans-Atlantic flight has been greeted after he has reached foreign shores with a cordiality which has been almost extravagant. Foreign fliers who have reached America have been officially and privately welcomed as conquering heroes, and even in the case of ex-enemies, have not only been greeted and feted but genuinely liked. American fliers in South America have been acclaimed as loudly as if they had been bullfighters.

French, Spanish, English, Germans all have had practical demonstration in America of the friendship-making power of air enterprise and effort. The heroes of great flights come into contact not merely with the crowds which see them land, but are invited with tremendous cordiality, sincerity and admiration to make tours of regions far distant from those landing points.

What happens to foreigners here happens to Americans abroad. A new influence has entered international life and it seems reasonably certain now that aircraft will not make war too terrible to be fought, but will make mankind too friendly to wish to fight.

THE WHEREFORE OF WAR

PART II—THE MASS TENDENCY

By

James Warner Bellah

If you will ask any naval officer who served at sea long enough before August 4th, 1914, to reach the grade of (let us say) commander, he will tell you that, in his experience when British and American sailors were given liberty in the same port with no other sailors present, they sooner or later came to blows. Furthermore, it has been the experience of the majority of the officers of the vintage specified, that given a third detachment of sailors—say German, French or Italian—sooner or later the Americans and British banded together to clean up the rest. The American and British vs. the German High Seas Fleet in Nagasaki in 1902, when the German liberty parties to the last man were dumped in the sewage canal for no good reason, is a case very much in point.

A simple example, perhaps, but illustrative of a fundamental cog in the fabric of men's minds.

Whether or not there is a basic difference in the breed of men, as there is in the breed of dogs—a fundamental difference that causes attraction or repulsion as it does between dogs, I don't know. It would seem, at times, that there is. A short, swart, brachycephalic individual of black hirsute adornment has as little physically in common with a tall, fair, dolicocephalic man with blonde hair as a Scottish terrier has with a shepherd dog. Why then, should we not believe that there is also a basic mental difference in their make up? It's a perfect logical assumption, just as it is an obvious fact that the terrier and the shepherd dog are diametrically opposed in mental potentialities.

Heredity stands then and always will stand as one of the differences between men. Vital or not, the difference exists. A white man is white; a black man, black; and a yellow man, yellow. Apparently they always have been and apparently they always will be. There may be friendships in individual cases—firm friendships. There may be movements for better understanding, but when all is said and done, one man is white, one black and one yellow —and each seeks his own kind and cleaves to it instinctively against the others.

The second fundamental difference is environment. There will be no attempt here to argue it against heredity. The obvious fact exists, and must be recognized, that the national environment of the first twenty-one years of a man's life shapes him in the mould of political, industrial, educational, and artistic philosophy indigenous to the country in which he spent those twenty-one years. And in certain salient respects, those philosophies, because of the continued existence of countries as separate units over a long period of years, almost invariably differ quite radically from the philosophies of neighboring countries. There is even a difference between the national philosophies of Canada and the United States. How much more of a difference there is between England and Italy—Japan and France—Argentina and Czecho-Slovakia?

These, then, are at present the obstacles in the path of the theory of the Brotherhood of Man—heredity and environment—each causing a difference to exist between races and countries—the main and the subdivisions of the classes of mankind.

Whether or not they can be overcome eventually is a question to be left to the minister and the priest, the ethnologist and the sociologist, the ambassador and the representative. On the other hand, it may be a question to be solved by as workaday a man as the aeronautical engineer and the pilot. He and his forerunners in the field of transportation have gradually shrunk the earth from the vastness of an unknown sphere to the simple dimensions of a well defined ball of rock, mud and water hurtling through space. As the years go on, he will shrivel it to a very small globe indeed. The smaller he makes it in point of travel time, the better understanding of each other will he give to the peoples of the earth. Understanding and contact, we have been told by the theorists, are the solutions for all problems of difference. In another decade we shall see a universal contact through international airlines that will be as much more thorough, complete and regular than the contact of today, as the fast ocean liner contact of today is more thorough, complete and regular than the contact of the Clipper ship era. It would be strange, but within human experience, if the mechanical science and the everyday concentration on the job before him of the flier brought to fruition the centuries-old labors of the priest and the ambassador. Ten short years and he will undoubtedly prove or disprove all the theories of greater understanding through complete contact.

Will international flying do the trick? No man can say. If it doesn't, Heaven help us, for the facilitation it will give to international warfare!

But let us go back to the present discussion and the present existence of difference.

There is no intention of assuming here that, because one man is white and one black, one an American and the other a Turk, they will always fight because they are different results of different heredity and different environment. But it must be most emphatically pointed out as an animal heritage of man that, when he encounters difference of heredity and environment in his fellow man, he approaches it cautiously and suspiciously with a margin of distrust. He doesn't like it at first sight any more than a placid shepherd dog can be expected to like a yapping, playful terrier at first sight. And conversely, just as the animal in him causes distrust, suspicion and caution when he approaches unlikes, the social gregarious man in him prompts trust, confidence and loyalty when he approaches likes. People from his school, his town, his profession, his country, his race—he accepts.

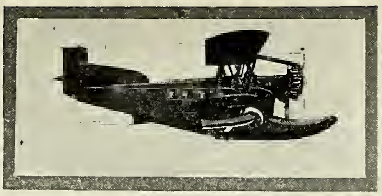
That, then, is mankind today. It was mankind yesterday. Whether or not it will be mankind tomorrow remains to be seen.

There are exceptions to all sociological generalizations, and there always must be, for it is far from an exact science. The exceptions to the above may prove the rule, or they may point to a gradual overcoming of the obstacles. No one can say.

The fact remains that today there are basic differences between the political and racial groups of men. The man in the street does not necessarily feel them, but he does see their surface manifestations and they come to the same thing. He hears the Englishman's accent—the Englishman hears his. He sees the Frenchman's Gaelic gesticulation—the Frenchman sees his Anglo-Saxon bluntness. The Japanese with his mechanical, oft-repeated bow believes himself ultra-polite. To the American he is absurd.

The differences are universal (*Continued on page* 256)

YO HO! THE VULGAR BOATMAN!



By Cy Caldwell

DESPITE my frequent and indignant denials, the rumor still persists that I have been killed and am now officially dead. I want to announce right here that I am not dead, or at any rate not any deader than usual. I never was very lively, you know. The rumor reached Washington that I was no more, and the Navy kindly sent a wreath. When I wired that I was still alive, they sent their regrets and asked for their wreath back. George Haldeman wired, "Heard you were dead. If you're not, please write; if you are, don't bother." Well, I'm still with you, though in these days of weird distillations there's no telling for how long; we're here today and near beer tomorrow. Man wants but little here below—and invariably gets it.

You'll be amazed to learn that, in conformity with President Hoover's suggestion to the people, I have at last taken to water. Let the Drys rejoice and lift up their voices in glad Hosannahs, for at last I am on the water wagon—a Loening amphibion that I am flying for the Thompson Aeronautical Corporation on their passenger, mail and express run between Cleveland and Detroit. There's a safety belt on this aerial water wagon, so I'm guaranteed not to fall off.

I took pretty naturally to this sea-going life, perhaps because I've been such an ardent Navy man that the tang of the sea has entered my blood. I'm getting quite a nautical roll into my walk, which is sometimes, and justly, mistaken for something else. And as for sea terms—well, you six readers should just hear me bellow, "Avast heaving! Shiver my timbers! Belay that and make taut—or fast, or whatever it is." I haven't got all the sea terms down pat yet, but I have enough of them to make the average land-lubber believe that in time of war I could proceed to sea and defeat an enemy—which is precisely what the old sea dog on a battleship makes the public believe.

Cy Caldwell, the ancient mariner

Now, folks, here's an ironic comment on human life: I've spent sixteen years of a mostly mis-spent life selling speed to someone or other—and I have never yet been in a hurry myself! That's a fact. I've toted hundreds of people who were in a very devil of a hurry to get somewhere in the least possible space of time, and I've never, so far as I can recall, been in a hurry to get anywhere, any time. I'm just a lazy old loafer who would be content to sit all day long in the sun with a fishing pole in my hand—yet here I am, in my declining years, flying on an airline that furnishes what I believe is the world's fastest transportation between the downtown districts of any two cities a hundred miles apart.

If you think I'm exaggerating, sue me. Or, better still (for no one has ever collected anything from me, and you'd be wasting your time sueing me) when you come to Cleveland and want to go to Detroit, try this: Get in a taxi at any hotel in the heart of Cleveland's downtown district, and in five minutes, under normal traffic conditions, you will be at the Thompson Air Depot on the lakefront. Step into the Loening, and don't trip, seat yourself and look out of the windows, or read a paper, or cry to yourself—do anything at all—and in 55 minutes the "Captain old" and the "First Mate bold" will fly you to the Air Depot at Detroit, where you step out and into a waiting taxi, which in 20 minutes at the outside will deposit you before the startled doorman of the Book-Cadillac, the Statler, or the Fort Shelby, as you prefer.

There you are! One hour and 20 minutes from downtown Cleveland to downtown Detroit. A mechanical mouse is offered as a prize to any little boy who can hold up his hand and tell Uncle Cy of any faster transportation system in the world over a like distance. And a lip-stick to any little girl. Sometimes the trip is made in less time—Ed Merrit made the trip last month, with a wind, in 41 minutes—and sometimes it takes longer: the same speedy Ed was forced down by bad weather one evening and crawled in next day at noon! But the normal time is an hour and a half, hotel to hotel; the flying time 55 minutes. And if a man wants to go somewhere in a hurry he must use up not only the plane's flying time, but the taxi's crawling time, from town to airport and from airport to town. And that's where the old amphibion or duck, has the edge on the land plane. Which is not by any means to decry the land plane; both have their places, their advantages, their limitations. A boat for instance, cannot operate over Lake Erie in winter; the plane can operate around it. But in the summer no passenger airplane yet invented can beat the amphibion between Cleveland and Detroit. Even a flying boat, unless it is much faster, is at a disadvantage. The amphibion is loaded on a ramp, but the boat must let its passengers off in a tender. And on this particular run the amphibion may fly across part of Canada, cutting off about 12 miles, while the flying boat must follow the Detroit River. (If I seem to be mildly enthusiastic about these ducks, pardon me. I like the things.)

There are three old shell-backs on this run—Lester Bishop, Eddie Merrit, and myself—battered old hulks of pilots with red faces, red noses, wheezy voices, and tired dispositions. All of us have been married for years and years, and look it. Tender maidens, coming to the dock to see the ducks depart, cast their eyes upon us and turn away, unthrilled, evidently disappointed. We can't do anything about it; we don't even care to; we're too old to bother. We're just three old able-bodied sea- (*Continued on page* 266)

HOT WEATHER FLYING

By Henry G. Boynton

Manager, Aviation Department
Moto Meter Company

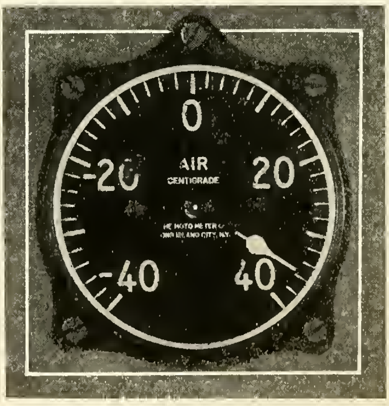
THE high mobility obtained by modern aircraft creates a new problem for pilots in that extremely rapid changes of atmospheric temperature are often met within comparatively brief spans of time. For example, when a pilot takes off from a field, the ground temperature may be 80 degrees Fahrenheit. Within a few minutes he may reach an altitude where the temperature is reduced by 25 degrees or more. Directly afterward he may fly over sandy wastes where the heat waves are reflected to such an extent as to rocket the temperature up to 100 degrees.

Such changes in atmospheric temperature naturally affect the temperature of the engine. To quote one of the leading engine manufacturers: "The proper cooling of an air-cooled engine is dependent upon the quantity and *temperature* of the air flowing over the various parts of the engine which radiate heat."

The temperature of an engine is the result of two factors. First, the heat generated by the engine itself. Second, the temperature of the air through which the plane is flying. For example, the pilot may notice that his oil thermometer registers an increase above normal. Glancing at his air thermometer, he observes that there is no corresponding increase registered there. One of the possible factors of over-heating (increased air temperature) is thus eliminated from consideration, and the cause of the increased engine temperature is clearly within the engine itself. If the condition persists, he knows that a landing should be made to investigate the cause of the trouble.

If, however, his air thermometer shows a decided increase, he knows that such a condition should obtain quite naturally and might be corrected by a change in his altitude.

Expert service men state that a pilot can expect the oil temperature indicator to show a rise of approximately 25 per cent of the increase shown on the air temperature indicator, variations in this ratio depending upon the type of engine. Because of the tremendous amount of research on many types of engines which would be involved in presenting this ratio graphically, this has not been undertaken. We know, however, that such a ratio is not constant but could be charted as an ascending curve. The first ten degrees of the air temperature increase will affect the oil but slightly, but twenty degrees will show a highly perceptible rise. The use of an air temperature indicator is, therefore, necessary to enable the pilot to determine whether an increase in oil temperature is due entirely to causes within the engine which should be investigated, or whether it is a normal increase resulting from a rise in the atmospheric temperature, which is not cause for alarm.



New air temperature thermometer

Another important element in hot weather flying is the selection of the proper lubricant; and it may not be amiss, therefore, briefly to review the methods and principles of aircraft lubrication.

Modern airplane engines are designed to operate continuously over long periods of time at a fairly uniform high speed and at full load. In order to secure a high thermal efficiency at considerable altitudes, the compression ratios employed are much higher than those used in other types of engines burning the same fuel. Because of this continuous heavy duty, the operating temperatures of the airplane engine parts are comparatively higher.

The material generally used for the barrels of the cylinders is steel. The material for piston rings ranges from brass or bronze to cast iron of various degrees of hardness. Pistons are made from carbon or alloy steels, aluminum, and cast iron.

Owing to high piston speeds and operating temperatures, the clearance which may be allowed between the pistons and cylinders of airplane engines is greater than that necessary in any other type of internal combustion engine, excepting those of racing automobiles.

With these facts in mind, one can readily understand the great difficulty of properly lubricating airplane engines. Steel against steel shows a tendency to overheat locally, causing the oil film to withdraw from the surface and leave dangerous hot spots which quickly score and at times even fuse from friction. Cast iron against steel provides a better wearing combination than steel against steel, but the tendency of steel to overheat locally still remains.

Of the three metals used in high efficiency engines, aluminum against steel offers the best metal contact combination. The only drawback to the universal use of aluminum pistons is that this metal requires greater clearance than cast iron or steel. The liberal piston clearances with which airplane engines are fitted allows a correspondingly greater escape of highly heated gases between pistons and cylinders, thereby rapidly destroying the lubricant between them and on their rubbing surfaces.

Unless sufficient cooling of the piston heads is provided for by sections of adequate thickness, the temperature at the center of the heads may reach somewhere between 600 degrees to 1400 degrees Fahrenheit. Lubricating oils freely splashed against such hot metal are almost instantly decomposed and thereby lose their lubricating properties. When aluminum pistons are used, their superior heat conducting properties aid materially in reducing the rate of oil destruction on the piston heads.

All aviation engines with the exception of rotative radial cylinder engines may be lubricated with a straight mineral oil. In the case of the latter engines (such as the Gnome motors), atomized gasoline mixed with air is drawn through a hollow stationary crankshaft directly into the crankcase which it fills on the way to the cylinders. Therein lies the trouble; for hydrocarbon oils are soon dissolved by the gasoline and are washed off the bearings, leaving their surfaces without sufficient protection, and resulting in instant wear.

Therefore castor oil is resorted to as an unfortunate compromise, because, being of vegetable origin, castor oil is highly susceptible to direct oxidation, and for this reason leaves a much more bulky

(*Continued on page* 248)

THE PASSING of PIONEER DAYS

By Ray Little

RAY LITTLE, the author of this article, was one of the original band of Army pilots who pioneered the air mail service with surplus Army planes. He later joined the Boeing System when it took over the transcontinental air mail contract. Little flew the first eastbound mail plane from San Francisco in September, 1920, and after nine years, he is still flying the mail. More recently he flew the first eastbound "Night Transcontinental" out of San Francisco. His regular flight now is on the trimotored twelve-passenger transports, which are flown at night over the Sierra Mountains.

Little has thus engaged in flying from the early, uncertain and more adventurous days down to the present when air transport has become a thoroughly systematized business proposition. In this article he relates a pilot's impression of the changes that have taken place.

Ray Little climbs aboard to take off

A PILOT used to go out all buckled up like a warrier looking for battle. Now he is a professional man with his suit pressed. On the trimotors I do not even have a flying suit. Parachutes are left in the hangar. A transport pilot, hooded and belted, is beginning to look like a Don Quixote. There is now little more adventure in flying a transport plane than there is in running a street car.

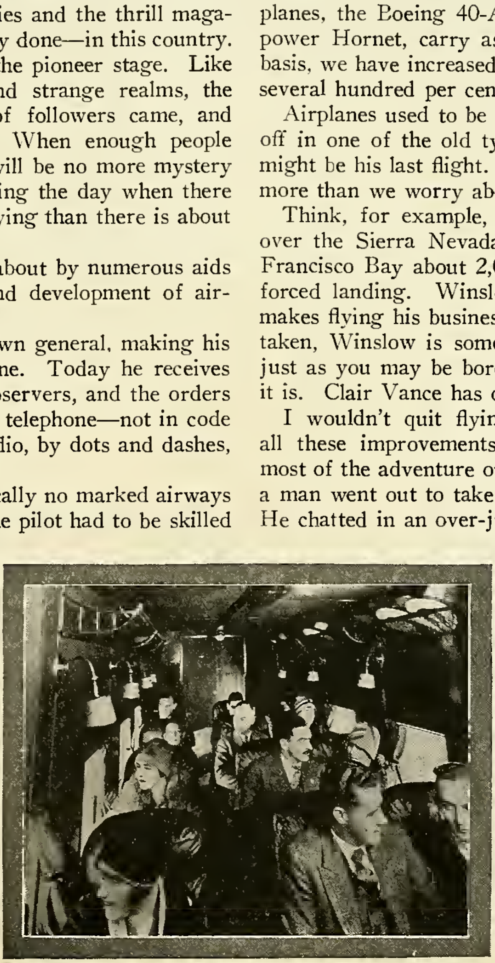
When a job is comparatively safe there is no more adventure in it. Daredevils of the air, like the bronco busters of the West, exist only in the movies and the thrill magazines. The air trail blazing is largely done—in this country.

Flying is rapidly passing out of the pioneer stage. Like all other adventurers into new and strange realms, the early fliers led the way, a host of followers came, and the romance began to disappear. When enough people are familiar with air travel, there will be no more mystery about it. We are rapidly approaching the day when there will be no more excitement about flying than there is about railroading.

This condition is being brought about by numerous aids to flight, aircraft improvements, and development of airways.

One year ago the pilot was his own general, making his decisions on his own judgment alone. Today he receives the advice of a corps of weather observers, and the orders of ground superintendents by radio telephone—not in code but in spoken words. Directive radio, by dots and dashes, tells him when he is off his course.

Two years ago there were practically no marked airways except the old transcontinental. The pilot had to be skilled in reading maps to find his way about. Today, a flier is aided by the signs on roofs and fields. Two years ago there were practically no lighted airways. Cross-country planes had to stop at night, except on the Transcontinental and a few other trips. Today the nation is rapidly becoming a web of chain lights at night. It is as easy to find one's way at night, in clear weather, as in the daytime. Airways are lighted and maintained by the Department of Commerce, not for the air mail contractors alone, but for all who wish to use them. The intermediate fields, weather reports and radio service are free to all. The other night I flew a Boeing trimotor over the Sierras, between 8 p. m. and 10 p. m., and my load of passengers acted as if it were a moonlight auto ride. Passengers are steadily becoming more casual about flying.



Air passengers now enjoy the utmost in comfort

Nine years ago we had nothing but airplanes and these were not too good. The Army planes with which we began flying the mail in 1918 would carry about 400 pounds, in addition to pilot and fuel. Those ships were equipped with 400 horsepower engines. Our present planes, the Boeing 40-A for example, with its 525 horsepower Hornet, carry as much as 1,600 pounds. On that basis, we have increased the efficiency of commercial planes several hundred per cent in ten years.

Airplanes used to be hard to handle. A man never took off in one of the old type without a vague feeling that it might be his last flight. Now we think nothing of it—anymore than we worry about riding in our cars.

Think, for example, of Burr Winslow, who has flown over the Sierra Nevada "Hump" between Reno and San Francisco Bay about 2,000 times. And he's had only one forced landing. Winslow, like all other transport pilots, makes flying his business, nothing more. If I am not mistaken, Winslow is somewhat bored with his job at times, just as you may be bored with your routine job, whatever it is. Clair Vance has done it 1,900 times.

I wouldn't quit flying—I like it. But I do feel that all these improvements and safety measures have taken most of the adventure out of the business. Formerly, when a man went out to take his run, he was armored for a tilt. He chatted in an over-jubilant way with his fellow fliers—much as the Musketeers must have done. Three or four men, holding hands like whipcrackers, took a run at your propeller. Maybe the motor started. Maybe the prop struck someone—as often happened. Then you took off in a great cloud of dust, with all the field force and half the town as observers. Those old ships would fly all right, and they had speed. But you didn't know what might happen.

Some of the most dramatic events of any pioneer era happened along the old Transcontinental. To fly alone over an

(*Continued on page* 284)

SELLING AIRPLANES ON THE INSTALLMENT PLAN

By A. E. Ellsworth

Alexander Aircraft Company

ESPECIALLY since the time that the supply of new war production motors became exhausted, prospective airplane purchasers and aircraft manufacturers have been searching for a finance plan which would permit the purchase of airplanes so that they might in reality pay for themselves. Numerous plans have been offered the public and patronized half-heartedly. In many cases, investors have been reluctant to offer money to an industry as new as aviation without protection which was almost impossible for the manufacturer and purchaser to give.

Insurance coverage was required, and as almost everyone will admit, the rates have been exorbitant. Perhaps because of the ultra-conservatism of established insurance companies or because the industry was so new that reliable accident averages were unobtainable, insurance costs have been such that most operators have preferred to assume the risk themselves. This was especially true with those conducting flying schools or other such operations where various pilots fly a single ship. Insurance policies demand that the pilot be named; consequently, in the case of the flying school with dozens of students flying each ship, the insurance policy has been of little value.

Airplane financing was practically unnecessary one or two years ago when a completely equipped plane could be obtained for approximately $2,500. At present, however, new production engines have increased the price of a complete plane two or three times, with a consequent narrowing of the airplane market. An adequate finance plan has become more of a necessity.

With these conditions existing, the Aviation Acceptance Corporation has devised a finance plan by which the purchaser may procure a plane by making an initial payment of 40 per cent of the list price and paying the balance in 20 semi-monthly payments. The charge, including all interest, is 10 per cent of the unpaid balance. There is no brokerage fee, no insurance charge, and the distributor is not required to endorse the note to the finance company. A contract has been signed with the Alexander Aircraft Company to handle its airplane time payment paper exclusively for one year.

Should the purchaser desire to complete the payments in less than ten months, he may do so at a lower rate. The following percentages are added to the unpaid balance for respective stated periods:

30 days, 1 installment	2 per cent
60 days, 1 installment	4 per cent
2 months in 4 semi-monthly installments	4 per cent
4 months in 8 semi-monthly installments	5½ per cent
6 months in 12 semi-monthly installments	7 per cent
8 months in 16 semi-monthly installments	8½ per cent
10 months in 20 semi-monthly installments	10 per cent

If the buyer furnishes crash and fire insurance equal to or exceeding the amount of the note and with a loss clause payable to the acceptance corporation, he may deduct 20 per cent of the finance charge.

All finance rates are based on the unpaid balance. Minimum down payments are 40 per cent of the flyaway price, and the maximum contract is for 10 months. First payment on the serial notes is due either the 1st or 15th of the month in which contract is dated and each 1st and 15th thereafter. Payments in whole or in part may be made before due, and refund for anticipation will be made on a basis of 12 per cent per annum.

If the purchaser chooses to carry no insurance and to spread his payments over the maximum period, however, the rate applies as follows on plane selling flyaway factory at $4,000:

Cash selling price of plane	$4,000
Deduct down payment (40 per cent)	1,600
Deferred balance	$2,400
Add finance charge which includes all interest at 10 per cent for 10 months	$ 240
Amount of contract	$2,640
Due in 20 semi-monthly payments of	$ 132

In offering this financing service, the acceptance corporation naturally selects its risks carefully. Credit statements from purchaser, whether corporation or individual, are required on forms furnished by the company with the conditional order and deposit.

A deposit amounting to 5 per cent of the list price is required with all orders before the corporation will investigate the credit risk. This is an evidence of good faith on the part of the purchaser. Should credit not be granted, the deposit is returned.

Flying schools which have a large enrollment of students but which are somewhat short on modern equipment can buy their airplanes on time, paying for them in 10 months if they desire. This enables them to handle more students and at the same time maintain a larger working capital.

The newly licensed pilot just out of flying school who wants to buy his own plane will find the time payment plan a valuable aid in launching a private business. Everyone connected with the aviation industry knows that there is still money to be made barnstorming over the country. It has not been long since pilots were able to go out and pay for their ships in thirty or sixty days. Although such a procedure may not be so easy now, there is still opportunity for young men to obtain a start in business in this way.

(*Continued on page* 260)

R. Rhea, Aviation Acceptance finance plan originator

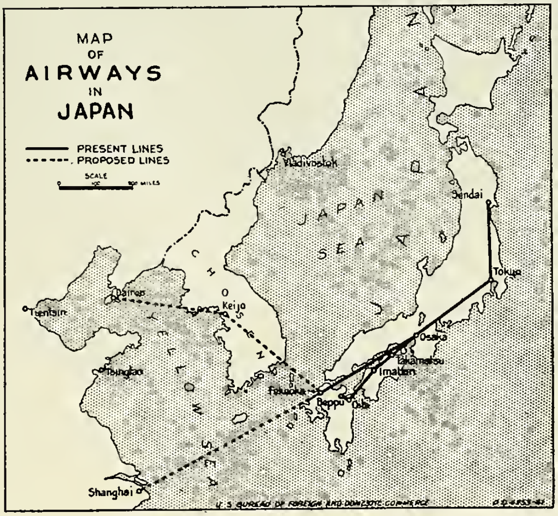
CIVIL AERONAUTICS IN JAPAN

By George J. Haering

U. S. Vice-Consul, Kobe, Japan

CIVIL aeronautics in Japan emerged from its infancy during the past year, but its present extent is still small in comparison with civil flying in the other countries with which Japan is ranked as a world power.

Developments during the present year, however, will probably mark the beginning of a new era in the annals of Japanese aeronautics. Government assistance will be extended to civil flying through greatly augmented direct subsidies and by the construction of airports and other facilities for commercial air service. These services are now four in number, operating over a total distance of 1,075 miles. Under the new policy, and within the next two years, three additional lines will be inaugurated over a distance of 1,289 miles, and the frequency of flights on two of the existing routes will be increased.



Japanese civil aeronautics is under the handicap of two adverse conditions—first, the probability that, for several years to come, the attention of the Japanese will be concentrated on development of their automotive communications, and that aeronautic activities are not likely to be undertaken by any significant number of private individuals; and, second, the lack of air-mindedness, the majority regarding civilian airplane flights as stunts or as a means of employing and training aviators for national defense.

Progress of Japanese Civil Aeronautics

Year	Number of aviators	Number of flights	Number of machines	Distance flown (kilometers)	Hours flown
1922	74	2, 465	25	149, 629	1, 211
1923	107	4, 815	51	273, 765	2, 331
1924	128	7, 858	53	404, 921	2, 523
1925	188	11, 765	67	579, 250	4, 688
1926	234	14, 747	82	762, 354	5, 949
1927	275	17, 987	86	878, 230	7, 313

These handicaps naturally have affected the development of civil aeronautics in Japan, but strenuous efforts have been made by the large Japanese daily newspaper *Asahi* to stimulate public interest and knowledge in aeronautics through exhibitions of airplane flying, through the Japanese flight from Tokyo to Rome in 1925, and through the organization of the first regular passenger air service in Japan.

The lack of general interest in civil aeronautics and its practical use is most evidenced in the paucity of letters sent by existing airmail routes, even though no extra postage is charged. A considerable factor in this attitude, however is the absence of night flying and the departure hours of mail planes, which have offset the saving in time between air mails and those transmitted by rail during the greater part of the week.

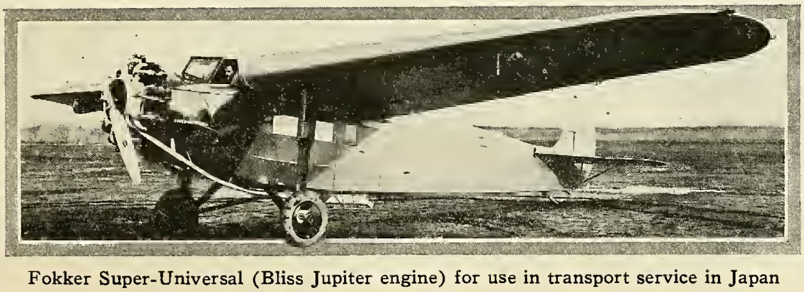
Civil aeronautics in Japan at present consists of (*a*) four commercial services maintained by private companies, with the aid of government subsidies; (*b*) air-news services operated by several Japanese newspapers for rapid conveyance of photographs and reports; (*c*) flying by a few individual enthusiasts engaged in aeronautic research or instruction; and (*d*) test flying by pilots of airplane manufacturers. Altogether, there were registered in Japan during August, 1928, a total of 215 pilots, of whom 6 were women and 4 were foreigners attached to aviation works. The number of airplanes owned or operated by civilians at that time is estimated to have been approximately 100, of which only about 60 are in operation for any considerable time.

The four companies maintain, respectively, a tri-weekly passenger, parcel, and mail service between Osaka and Tokyo (272 miles), using 8 machines that accommodate 22 passengers in all; a tri-weekly mail service between Tokyo and Sendai (229 miles), using 7 machines; a tri-weekly passenger and mail service between Osaka and Fukuoka (310 miles), using 7 machines that accommodate 7 passengers in all; a regular passenger and mail service between Sakai and Oita, via Takamatsu and Imaharu (263 miles), using 5 machines.

Newspapers and news agencies, the civil operators next in importance, transmit part of their inter-office communications by airplane, and by the same means obtain from distant parts of the empire prompt reports and pictures of current events having important news value. Carrier pigeons also are used for this purpose when short distances are involved.

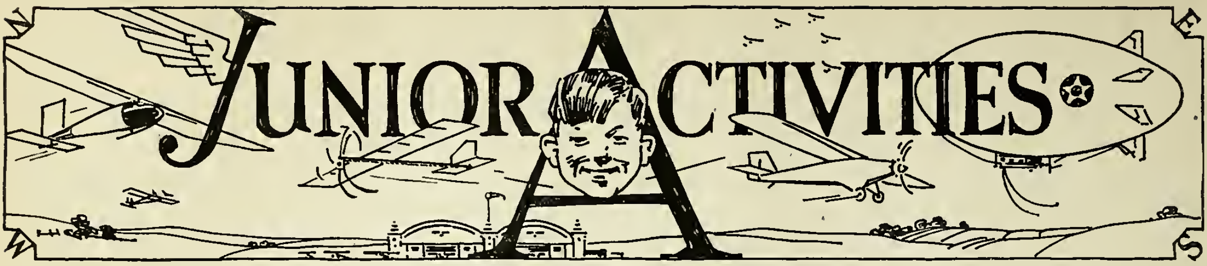
The eight principal newspaper operators maintain altogether more than 20 airplanes in this line of work, and the largest three also sometimes deliver their papers when abnormal conditions prevail in any section of the country necessitating a different method of delivery.

The statistics in the accompanying table, abstracted from the Japan Yearbook for 1929, furnish an indication of the progress made in Japanese civil flying at the close of



Fokker Super-Universal (Bliss Jupiter engine) for use in transport service in Japan

(*Con. on p. 262*)



MAKE AND FLY THE WINDJAMMER

FIVE MINUTES WORK HOURS OF FUN

By R. E. Dowd

COME on Boys! We're going to study and build aircraft. We say "Aircraft" because we mean all kinds of flying contraptions; gliders, airplanes, parachutes, balloons, dirigibles, helicopters, ornithopters, boomerangs. In fact, in every edition, we're just going to cram at least two pages with real new and interesting ideas, drawings, and notes on experiments.

Mr. Tichenor, President of AERO DIGEST, who has already done so much to encourage the younger generation to study aviation, says: "Let's help the boys—let's give them all the coaching we can. These lads will soon be the leaders in the industry—let's help them." Now, boys, as the editor of your Junior Activities department that's my job, and don't hesitate to write me for any information that you may need. I've been experimenting for a great many years in this line, and my accumulation of experience is always available to you.

We also want to learn about what you are doing. Send good clear photographs of your models or drawings of your ideas. In some cases we may want to ask your permission to publish these.

The Windjammer

FIRST let's get this unusual name straightened out in our minds. "Windjammer!" Have you ever heard of small ocean boats called windjammers? They are staunch, rugged craft which daily ply at their tasks going here and there, but always with complete dependence on the wind. Right there we have the big idea back of our first model airplane. It is dependent on the wind for extended flights. It has no motive power. You'll say, "Oh, yes, it's only a glider." That's right. It *is* a glider, but it is an airplane too because all gliders are airplanes in the broad sense of the word. Suppose I told you, you can make this little plane in about five minutes, and that I have frequently flown them up to heights of 1,000 to 2,000 feet—sometimes climbing out of sight! And duration, three-five-ten minutes. The small picture shows the writer launching a windjammer into the Grand Canyon. Notice the fellow watching the flights. If you were there you'd watch too. It was a wonderful sight to see the little windjammer set out with the confidence of a veteran—out over the great yawning canyon—now rising—now falling—turning, spiraling, climbing, but always in perfect stability. Of course, some flew farther than others. Some started nobly and after traveling several hundred feet turned back and came almost within arms reach of the starting place as though they lost nerve and wanted new encouragement. Others just climbed up and up on rising currents of air and flew out of sight. Even the majestic vultures circling overhead flew no better. The windjammer is a real flier.

On another occasion, in the presence of some of the world famous sailplane experts, the writer launched some windjammers from the top of the Woolworth Tower in New York City, and they climbed up to heights of one thousand or fifteen hundred feet and flew over the Hudson River. Sounds too good to be true, doesn't it, but these things have been done—not once, but many times. And you don't need Grand Canyons or Woolworth Towers to get good flights. A hill, cliff, sandbank, a high building, these all make good launching places. So much for performance.

R. E. Dowd launching a "windjammer" into the rising currents of the Grand Canyon.

Let's make one now. All you need is a sheet of letter paper and a pair of scissors. The accompanying drawing tells the story. Figure 1 is your sheet of paper. It should be about seven inches wide and ten inches long. You can make them smaller or larger than that, but that's a good size for your first one.

Now just fold and crease the sheet as shown by the dotted line A-B. This is just one-half way from the ends of the sheet. Next fold the bottom edge up to the dotted line as shown by figure 2. Now fold again up to the first crease as in figure 3, and then another one as in figure 4. Now the last one, you fold the whole edge back using the first crease and taking care to flatten it down smoothly.

Next we fold the sheet from front to back evenly as shown in figure 5, and while it is closed together like a book, cut the two slots as shown. These cuts are one-third from the edges, and they cut one-half way down to the crease.

Now, we're ready to bend up our fins. See figure 6 and you have the idea. You see they are bent up vertical on the dotted line. These fins are for the purpose of stabilizing the flight just like fins on large airplanes. In fact, fins are sometimes called vertical stabilizers on real airplanes. Their action is so simple, too, that we might as well understand it now. As the airplane flies along, a gust of wind may upset it for a moment and it may start sliding or skidding sideways, but these fins, being high up where the air strikes them, prevents this side slip and the plane rights itself quickly.

The action of the dihedral angle (figure 6) is similar, and just as simple. When the plane tips, the lower wing offers more lift because it is more nearly horizontal. The upper wing has less lift and naturally the plane comes back on an even keel.

Well, let's see, we're almost finished. After truing up the plane by sighting down the fold as shown in figure 6, just curl up the trailing edge a little as shown. This prevents the plane from nosing down or doing a "nose dive." In large planes this is called a negative angle stabilizer. The action is simple also for as the plane starts to nose dive the air pressure acting against this negative angle tail pushes the tail down and the nose comes up again.

Now, let's try a flight. Hold your first finger in the "Vee" fold and with the folded edge away from you, let it glide. If it goes to the right or left check the alignment and you'll find something twisted. Remember, things don't just happen. There'll always be a reason there somewhere, and you can quickly trace it. If it noses down too steeply, curl up the trailing edge more. If it stalls (loses flying speed by trying to climb too steeply) reduce the amount of upturn on the trailing edge. A good adjustment will give you a gliding angle of one in three or four—that is a horizontal distance three or four times the height of fall.

By the way, let's check up on the location of our center of gravity. That sounds complicated, but all you need is a pencil as shown in figure 8. The point where the plane balances is the center of gravity, a very important factor in airplane design since it controls the balance. Well now that you have the center of gravity or C. G. as the pilots and engineers call it, you can find the center of pressure, or C. P., for if your plane glides in perfect balance the center of pressure or center of lift must be the center of gravity or weight.

You see, boys, all this we can figure out of our little windjammer, but let's do some flying now. Let's make up five or six and take them up to a high hill or building and launch them against the wind. The wind shouldn't be too strong for best results. Keep trying on different days and in different winds, and when you least expect it your little windjammer will sail off without even saying "goodbye." Up and up it will climb, and you'll be so surprised you won't believe your eyes. Next month we'll tackle a more advanced design.

Here are a few lessons from the windjammer. Have you learned them?

1. Aircraft types. Can you name them?
2. Windjammer. What is a windjammer?
3. Glider. Can you give the definition?
4. Fin (vertical stabilizer). What is it? Could you point out the fin on a large plane?
5. Dihedral angle. Do all planes have dihedral angles?
6. Negative angle stabilizer. Why do we need it?
7. Stalling. How can it be remedied?
8. Gliding angle. Describe it.
9. Center of gravity (C. G.) What is it? How can you find it?
10. Center of pressure (C. P.) First you find what center in order to locate the C. P.?

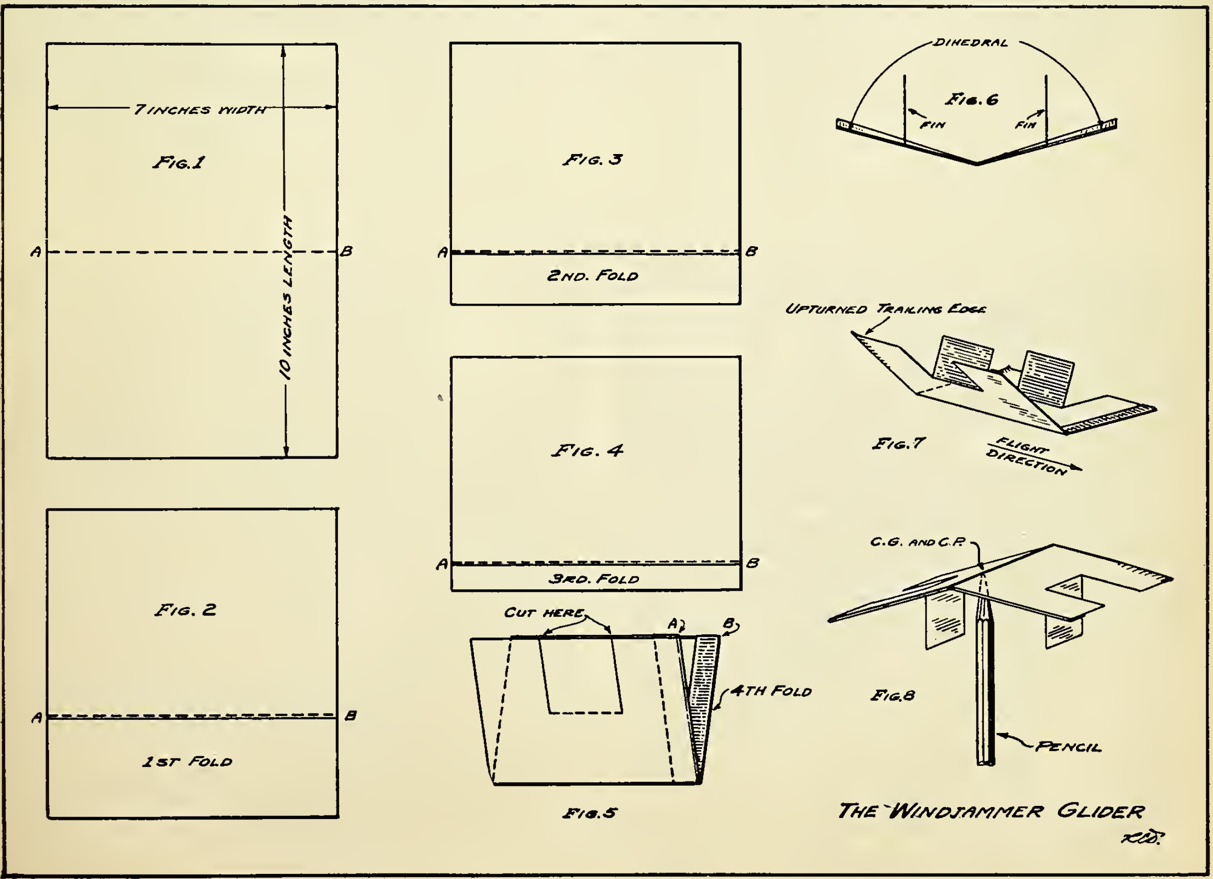
THE NATIONAL MODEL CONTEST

Louis Proctor, winner of the Aero Digest scale model prize, a trip to Europe.

IN the scale model competition of the National Airplane Model Contest at Detroit under the auspices of the *American Boy* magazine, there were 129 entries, each a duplicate of some well-known make of airplane. Judges started the work of checking measurements on Monday, June 17, under George F. McLaughlin, Editor of AERO DIGEST. By Friday the entries had been checked, scored, and listed in order of merit, and it was known that Louis Proctor, 19, of Vancouver, Wash., had won the contest.

Proctor, like 78 other entrants in the scale model event, did not come to Detroit with his model. He had to be informed by telephone that his replica of a Vought Navy

(*Continued on page* 230)



THE WINDJAMMER GLIDER

SELECTION OF STORAGE EQUIPMENT FOR AIRCRAFT FACTORIES

By J. H. Meyer
Lyon Metal Products, Inc.

THE extent to which American business men have already accepted air transportation presages a great development, the beginnings of which we are only now beginning to feel.

This condition places a heavy responsibility on the purchase and installation of aircraft factory and storage equipment, especially on the types of equipment which are regarded as permanent investments, which may have to be re-arranged to suit changing conditions and which require additions to take care of expanding operations. Steel storage equipment for the stockroom and toolroom falls in this classification.

Such equipment is practically permanent, saves 20 per cent to 30 per cent of floor space, cuts down the fire hazard, is movable without loss and is easily adjusted to changing conditions; and new equipment, identical with the old, can be installed in a very short time and without trouble.

In manufacturing aircraft, stock classifies into five separate groups—raw materials stock, purchased goods stock, work in process, finished stock and service parts.

Inspection departments for incoming raw materials need steel tables and individual units of shelving for stock as it passes through the department.

In the raw materials department, standardized steel shelving is adjustable in a variety of ways so that materials can be stored in small space with maximum protection and can be handled quickly and easily.

For instance, tubing and bars require two kinds of racks. Duralumin tubes and bars must be stored on the protruding arm type of bar rack so they can be handled gently and without scratching. Other tubing and bars can be carried in deep compartments of standard shelving.

Small parts, such as fittings, bolts, nuts and screws are carried in bins. Wire, in reels or rolls, is carried on shelves or rounded bars.

Production departments need shelving units at several points to protect incoming small materials from damage and loss. This helps to maintain clean-cut lines of operation.

In the machine shop, shelving protects dies and other machine attachments and stores them in a very compact way. Small tool cabinets, equipped with locks, at each machine save hours of the operator's time every week. These cabinets hold special attachments for the machine and the operators' precision instruments. Overnight safety of tools, checked out to the operator, is thus assured.

In the toolroom operating costs are minimized by the use of toolroom shelving and the tool check system of control.

In the stockrooms for finished materials and purchased stock, special assemblies of standard racks save space, protect materials and simplify stock control. Portable racks, moved on lift trucks, or smaller racks on casters save rehandling of parts and help speed up production.

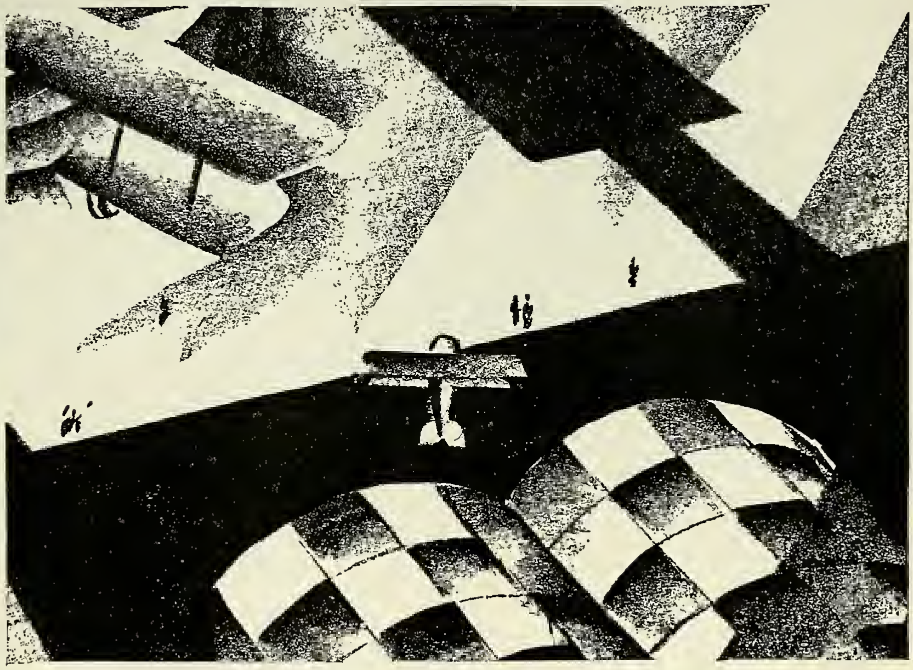
Large plants usually carry service stock separate from raw material and finished stores. In the service stockroom motor parts, fast-moving fuselage and panel parts, clothing, shoes, goggles, gloves and parachutes, each require a different type of bin, shelf, or compartment to use space most economically.

Because of the present rapid growth of the aircraft industry, much equipment at airplane and engine factories must be replaced or supplemented soon after its original installation, but equipment of this character is more permanent because it permits re-arrangement to conform with expansion.

In the above we have simply touched on the high points of the storage equipment needed in the modern aircraft factory. Such equipment is an economy because it is exceptionally well suited to the present requirements of the industry and because future developments will not render it obsolete.

Left: steel storage shelves at the Boeing factory in Seattle; right: engine parts in stock at the Fairchild plant at Farmingdale, L. I.

MUDLESS, dustless aprons *that isolate* tuning-up *dangers*



AIRPLANE pilots and mechanics are the most enthusiastic "rooters" for Tarvia aprons. These men appreciate Tarvia's genuine consideration for themselves and their planes. For on a Tarvia surface—whether apron, runway or service road—"props" can turn up to their maximum without danger of sucking up loose material and hurling it back to do serious damage to motor and fuselage.

From the engineer's viewpoint, Tarvia is likewise preferable. The Barrett Company's 25 years of paving experience has proved a real help to the airport engineer who must make every penny of his limited appropriation give *results*. By utilizing local materials, Barrett keeps the cost down right from the start. Smooth, resilient, skid-safe Tarvia pavements can be constructed inexpensively, and maintained in first-class condition, easily and economically.

The Tarvia field man will give you complete details. Write, 'phone or wire our nearest branch office.

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Tarvia
FOR ROAD CONSTRUCTION
REPAIR and MAINTENANCE

PERSONAIRLITIES

by

Cy Caldwell

WHY the humble Contributing Editor of AERO DIGEST is slowly but surely turning grey, and moving, with ever more faltering footsteps in the general direction of the boneyard, will be apparent to the six devoted scanners of these columns when they peruse the following contribution, only one of many of like tenor from the same correspondent, a peculiar individual who delights to sit down and pen such letters as this:

"Dear Uncle Lope: You are the silliest old crazy that ever blew the top off a well shook-up beer bottle. I used to revere the few minutes we had together each Sunday at Church. The hours that we spent in tranquillity in the lovely Springtime walks (not forgetting the cowslips) down the old Elm-arched koupath. After those altogether too brief moments at Detroit (this side of Windsor), I have had that great heart ache of and urge for to see you soon all of a sudden, or not at all. Here it is, or there it was, a lovely time. Even to this every minit I can sweetly sniff the gentle odor of unquaffed, even unopened, beer, as it lay on the floor shivering in its own draught.

"Robert H. M. Herron (the H. M., Uncle Lope, means Hot Mama) joins hands with Newall (the world-known vocal artist) Leech and they are both madly ramping about the office and each time they pass by me shout faint but discernible tones, 'Oh! Give our Love to Uncle Lope.' Now dear Uncle Lope you will perhaps pardon me if I, like the great Pterodactyl, will firmly with a fast sorrowing heart withdraw my effort at communication. Believe me, very respectfully, your little Nephie, Sturatz.

"P.S. You perhaps wonder why I call you Uncle Lope. Well, dear Uncle Lope, it is because all the big aviators at Detroit have called you a Walri—for why I will never know, excepting that I heard that charming remark, 'If that big stiff Caldwell would get off the floor I would probably dance with that girl myself.' Or, 'Did you ever see anybody so light on his head—I mean feet—as Cy Caldwell?' So you see, dear Uncle Lope, I don't want to call you a Walri, and I don't want to call you lightheaded and leaden-footed, so I call you Uncle Lopaz. This is Stuart Auer signing off the Children's Bed Time Hour."

For pure undiluted and delightful insanity on a typewriter the Croix de Type with two palms and a couple of dingle-berries is awarded Stew Auer, whose effusion would have been recognizable to his many friends even had I deleted his name. For whenever Stew has nothing to do, which is practically constantly, he sits down and writes something like that to someone. The startled recipient of these favors concludes, not unjustly, that Stuart has gone mad; upon which he shows the letter to others, who arrive at the same conclusion, with the result that the news, travelling from friend to friend, finally reaches Stew in this form: "Say! I heard you'd suffered a mental breakdown. How is the old head now?" This so delights Stew that he immediately sits down and writes 17 more letters, even madder than the others, and hurls his friends into confusion even worse confounded.

Recently he sent me a biography, covering seven closely-typed pages—a book in itself. I sent it to a friend of mine who is taking the Keeley cure (on account of a pink elephant that sat on his bed every evening, picking its teeth with a section of railroad track) and the friend, partially cured (the elephant by that time had thrown away the track and turned green) translated Sturatz's biography as follows:

"Dissecting your friend's life history from the original Russian and Czecho-Slovak in which it was evidently written—unless the characters are Hebraic or Delicatessen, I can't say which, and who cares?—I come to the conclusion that he sells insurance, and consequently could force an Eskimo to buy a Frigidaire to keep early lettuce in during a non-stop flight to Hoboken. And why stop at Hoboken, anyhow? Tut, tut!

Pilot Stuart Auer

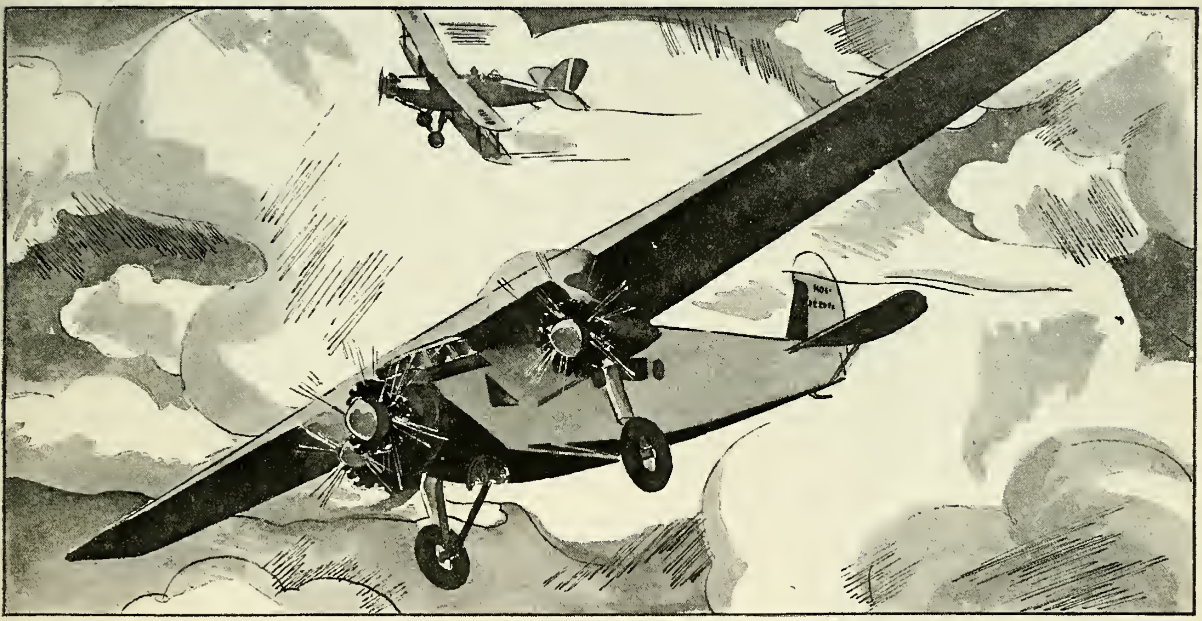
"It seems to have been 1913—whether A.D. or B.C. deponent does not state—when Stew Auer broke into aviation with Jack Armstrong. With low animal cunning—for they had no technical knowledge whatever—they constructed a glider. Armstrong seems to have been the cleverer of the two, for the test pilot of this glider, or perhaps sinker is the word, was Auer. Stew Auer—mentioned in that sweet poem, 'Childhood's Simple Auer'—got aboard the craft, headed it *down wind* over a bluff about 175 feet above Milwaukee Bay, and left the elements to do the rest. Which, of course, the elements very obligingly did, ably assisted by Old Man Gravitation, who was on the job as usual. The glider, plus Auer, shot, or glided, or glid, or perchance glode, toward the bay, after which the nurse said, 'Sit up and take this.' And that was that.

"Next year Auer spent in wiping grease from 'Fish' Hassel's boat onto himself, and finally became so grease-covered that he was, in 1916, entered as a flying pupil in the old Gallaudet School. One hour of Auer finished the school, which went broke, leaving Auer with many an idle hour, until the great American urge to start something had crystallized to the point where Uncle Sam had decided to join the late fracii. Upon which the bold Auer joined the Flying Corpse as an embryo officer and gentleman (temporary) and was forthwith and with despatch set to work peeling potatoes, digging ditches, and otherwise disporting himself cadettishly in the manner best calculated to give young officers greater poise and *savoir faire* on the ballroom floor. When the last ditch was dug, Auer was sent to Issoudun, France, in November, 1917, to fight his way through the war as best he could. He returned safely, bought a Tommy Morse, which a friend borrowed and gaily flew into two Air Mail DHs, which Auer had to pay for. This so delighted his wife, whom he calls Ruthie-uthie in unguarded moments, that she put an end to his flying activities on the not unreasonable grounds that three crashed airplanes per day were too great a drain on the family fortune. From 1923 to date Stew, otherwise known as Auer, Incorporated, has specialized in aviation insurance, until he now has sixty people engaged full time, and fifteen part of the time. So you see he can't be as crazy as he writes."

ONCE upon a time there was a young man with $3,500, part of an airplane, and an idea. That time was only a year ago. Today the same young man is incorporated for $3,000,000, operates 22 ships, directs 18 pilots, has a suite of offices

(*Continued on next page*)

In *the air,* as on the road, *durable beauty* takes precedence



PLANES today must meet the same keen competition in styling that governs modern motor car construction. The growth of passenger air-transportation and the widespread use of private planes have thrown a new importance on luxurious appointments that retain their beauty.

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MEMBER OF AERONAUTICAL CHAMBER OF COMMERCE

(*Person Airlities Continued*)

vaguely resembling those of J. P. Morgan, and operates an airline that serves Oklahoma City, Wichita, Kansas City, Dallas, Wewoka, and Wichita Falls. The young man is Paul R. Braniff and he seems to be a wizard in this aviation transportation business. When I think how far he went with part of an airplane, and how far I haven't went with a whole Corona, I could just break down and cry. And I should have got farther with this Corona, too. Look at Elinor Glyn—all she had was one idea, IT, and look what she did with it.

Anyhow, I like to hear of somebody else getting along some place except in years. Benny Turner, Aviation Editor of the Oklahoma *News*, writes: "The one thing that Paul Braniff has done for airline operation and which cannot be ignored is that he has practically worked out the problem of short-line air transport, and has expressed his accomplishment in a bank account. The problem of inter-line traffic is one that must be solved by the operators of trunk lines. Braniff has worked out the details of this essential feature of large business in such a manner that his handling of the problem will stand as an example to all operators who must eventually confront the same situation."

Paul R. Braniff

When Paul Braniff started his line he worked as chief pilot, mechanic, ticket agent, publicity manager, and business manager. He was practically a one-man band. He had learned to fly about 1920, and for several years continued it as an amusement, while he conducted an insurance agency. Then he sold Travel Airs, Eaglerocks, and flew in the 1926 National Air Races. Now he's a Colossus of Transportation—and all in a year, from a standing, or sitting start of $3,500, part of an airplane, and a whole idea. If I knew how he did it, I'd be able to hurl this accursed typewriter out of the window and go and do likewise. But I don't, so I won't, so there.

PILOT JOE E. MILLER has had a brief but hectic career in the air since he took his first hop with Tex Rankin at Walla Walla, Washington, in 1926. He became a dodo at Brooks Field in July, 1927, and only lasted a month, when they threw him out on his ear. Pained, hurt, and grieved, Joe went back to farming. But you can't keep a good man down, so a month and a half later Joe was nervously doing his first solo in Wichita, and getting away with it. Then he bought a Swallow, nearly starved through the winter as a mechanic, the while he learned motors and got in time. He felt so bucked up at this that he got light-headed or something, for in June, 1928, he took unto himself a wife—apparently unaware of the warning issued by Rudyard Kipling: "Whether down to Gehenna or up to the throne, he travels the fastest who travels *alone*." Kipling might have saved him. But I don't know. He never saved me. Joe moved to Olean, New York, where he had a good job flying for a private owner, until the owner, in a weak moment, decided to go solo himself. The owner, the wreckage, and Joe's job were removed at the same time. By this time, I trust, he has another job. With a wife, he needs one, indeed.

Pilot Joe Miller

* * *

FOUR years ago Malcolm L. Hathaway was lifted into the air by the great U. S. Navy. Apparently he must have looked the situation over well and arrived at the conclusion that it would take at least four more wars to shove him into an Admiral's chair, for he got out, leaving the defense of the country to those who do not care greatly for money. With his brother Stephen, he formed the Tred Avon Flying Service, Inc., at Easton, Maryland—the state that, according to an old song, was suffering from heart trouble. You recall it? "There's a Girl in the Heart of Maryland," which, I should say, was more of an affliction than a leaky valve. With the aid of two Waco Tens, the brothers Hathaway run a flying school and study maps, as you may be seen from the photograph. I believe they are engaged in hunting up some livelier spot than Easton to fly to.

The Brothers Hathaway

* * *

WHEN you see "Hell's Angels" produced by the Caddo Film Co. take note of the dummy that Roscoe Turner throws out of his Sikorsky bomber. (I believe the old crate is disguised as a Gotha in that picture.) The dummy hurled out by Roscoe is none other than Pilot Edd J. Greer, late of Oakland Airport, where he had a school, and now of the Caddo Film Co. Edd—not Ed—has been flying since 1923. In '24 he went to Brooks and Kelly Fields as a Kaydet, where he lasted 9 months before he joined the well-filled ranks of those who got "thrun out," as my friend Shorty Schroeder would remark. After this debacle Edd went rapidly down hill by the barnstorming route. The officer and gentleman days were only a memory to the unfortunate Edd, who had to give his own personal attention to the internal mechanism of OX-5s and other greasy contraptions for aerial voyaging. He lost all the polish off his nails, but he gained a lot of experience, for after 1,100 hours of flying he has not yet cracked up once, which speaks volumes for him. From March to September, 1928, he operated his own school, but got very tired of that—and who can blame him?—so now he's in the movies.

E. J. Greer

* * *

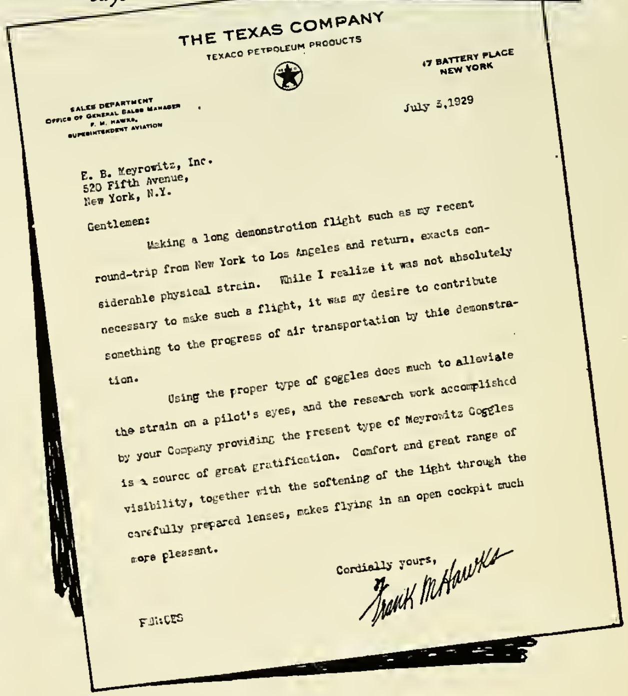
I KNEW I only had to hunt long enough —about four years—and I'd find him the absolutely honest pilot. I feel like Diogenes after discovering this bird, the Honorable David B. Read, of Oshkosh, B'gosh, Wisconsin. He writes, candidly: "You ask for a biography and a picture. I don't think I deserve the compliment. What did I ever do? I'm just a common pilot of about the average type. Been at it over three years now, Standard, Jenny, Waco-10, and now a Whirlwind Waco. Most of the time short passenger hops; now and then a little taxi service or advertising contract. As a business man I am far from a howling success, but I still believe in Santa Claus and the Dept. of Commerce. The only thing in my favor is that I never cracked up. The worst was to break a wheel and prop. I'm still single, praise be. Also I call myself the Read Aero Service, while others call me anything they care to, and I have to stand for it." Such modesty, in this age of Ballyhoo, is very refreshing.

David B. Read

17½ Hours coast to coast

the fastest time ever made across the continent

Captain
Frank M. Hawks
says



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TEXACO PETROLEUM PRODUCTS

17 BATTERY PLACE
NEW YORK

SALES DEPARTMENT
OFFICE OF GENERAL SALES MANAGER
F. M. HAWKS,
SUPERINTENDENT AVIATION

July 3,1929

E. B. Meyrowitz, Inc.
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Gentlemen:

Making a long demonstration flight such as my recent round-trip from New York to Los Angeles and return, exacts considerable physical strain. While I realize it was not absolutely necessary to make such a flight, it was my desire to contribute something to the progress of air transportation by this demonstration.

Using the proper type of goggles does much to alleviate the strain on a pilot's eyes, and the research work accomplished by your Company providing the present type of Meyrowitz Goggles is a source of great gratification. Comfort and great range of visibility, together with the softening of the light through the carefully prepared lenses, makes flying in an open cockpit much more pleasant.

Cordially yours,
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Flying his Texas Company, Wasp-powered Lockheed Monoplane at 3 times express-train speed, Captain Frank Hawks shattered 3 coast to coast speed records . . . 19 hrs. 10 min., New York to Los Angeles; 17 hrs. 38 min. Los Angeles to New York; round trip (one stop) within 44 hrs.

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If you wear glasses send your prescription and we will supply Luxor Goggles with accurately matched lenses. Special lenses developed for any conditions.

GASOLINE SERVICING AT AIRPORTS

By Dudley M. Steele

Manager, Aviation Department,
Richfield Oil Company of California

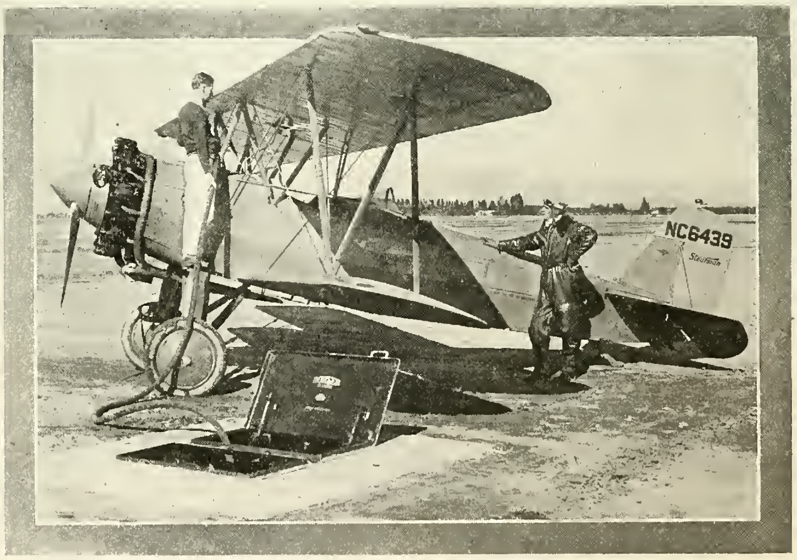
IN the early days of commercial aviation and, by that, one need go back no further than August, 1926, airplanes were serviced as were the first automobiles,—by filling gasoline tanks from a hand can. And even today, because of the rapidity of the growth of the aeronautical industry, one may still see "primitive" methods of servicing. There is, however, rapidly coming into universal usage as "better practice" an underground system. Although this new system is in many respects identical with that used at automobile filling stations, it necessarily has several additional features. The quantity of fuel to be taken on, the variation in the size of planes and their gasoline container locations, and the safety factor are principally responsible for the differences between airplane and automobile servicing equipment.

As the can methods may still be found, so, too, may one yet see the use of the gasoline drum with a pump, or the gasoline drum possibly mounted on a truck. Another but more modern method which is widely employed consists of filling the plane's gasoline tank directly from the marketing company's delivery system with a compressor attached to this tank wagon so that the force speed system may be used.

The safety factor has unquestionably been the major consideration in so rapidly extending the use of the underground method in airplane servicing. As aviation grew, it became essential that a method of handling gasoline be devised that would virtually eliminate fire risk, particularly with the larger and more expensive planes so generally used by the major transport companies. Moreover, with the adoption of scheduled flying on the principal airlines, the problem of speedy servicing has become more important. The underground method has furnished the most practicable solution to this problem. Then, too, the time had arrived for the pilot to climb down from his pedestal and to realize that he was more or less a working man with responsibilities to the company paying him his salary and that he could no longer expect to be catered to by everyone with whom he came in contact. Another reason for the underground system is that the average well-conducted airport has become an extremely busy place, and with the older methods, there would be equipment and individuals on the field who might be in the way of departing or arriving planes. These things particularly led to the building and adoption of the present underground system, to which a plane taxies when in need of gasoline and oil.

The practical uses of this method have greatly influenced its present form. The variation in the size of planes and the location of the gasoline tanks made it necessary that the gasoline hose be long. A 50-foot hose has consequently been generally adopted. Because of the amount of gasoline to be taken aboard (amounting to 600 gallons in case of the larger ships), speed was a factor and a force feed system capable of filling such a ship in approximately 12 minutes has been adopted. As for safety,—this underground equipment is so built that static has been abolished and there is practically no possibility of a spark passing from the equipment to the gasoline and causing an explosion which might destroy the ship itself.

From an educational standpoint servicing is now almost exclusively in the hands of the marketing organizations. Aviation gasoline is almost without exception being handled directly between the refiner (marketer) and the ultimate user, with the jobber or distributor a figure to come into the picture possibly at some later date. Because of this fact, there need be no misconception of the ability of the marketer to advise as to the proper method of servicing. The aviation departments of oil companies are manned almost 100 per cent, at least insofar as department heads, their assistants and sales personnel are concerned, by fliers of many years' experience who use planes in their travels and so keep conversant with modern methods and developments that should come in the industry.



Filling the tank of a Stearman from a Bowser fueling pit.

As commercial aviation continues to advance, the cost of servicing will be more and more a consideration. The cost of a movable truck is approximately $2,500, considerably in excess of the cost of the latest type electric underground fueling pit with a 50-foot self-reeling hose, 25- to 30-gallon per minute dispensing capacity, 1,000-gallon tank, moisture filter, air release, pipe line strainer and measuring meter. Disregarding the difference in the original cost of the two classes of equipment, depreciation on the truck is roughly 2½ times as great as that on the underground equipment. Besides, the truck consumes gasoline and oil and requires tire replacements, constant close attention and repair. Against this, underground equipment depreciates much more slowly, is practically fool-proof, rarely gets out of order, is never in the way, requires but a minimum of electrical current to operate, and is in every respect far more economical than mobile equipment.

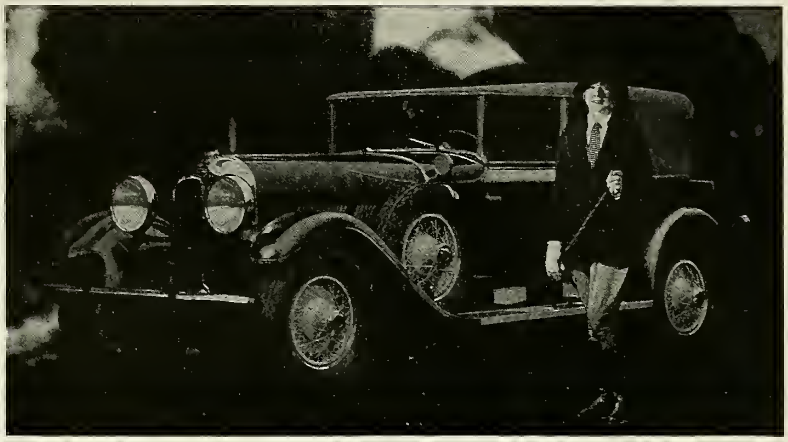


Photo by courtesy of the Auburn Automobile Company. This is the famous 120 horsepower Phaeton Sedan

Aviation takes a lesson from the automobile . . .

Where would the sales of automobiles be—millions every year—if it were not for the styling effect of beautiful lines and bright gay colors! The appeal to the eye is quite as important a sales factor as performance itself.

And aviation must follow suit. Today beauty has the call, from cigarette lighters and fountain pens right on up to houses, automobiles and airplanes.

The Murphy Varnish Company has a great deal to say on this subject. You will find it in the "Specification Manual for Aircraft". And you will find that Murphy products are designed to give not only beauty, but beauty that stands up longer, to do credit to the aircraft manufacturer and to build good-will for him wherever his ships may go.

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AIRPORT AND AIRWAY

News of airlines, airports, and airways; radio, lighting and other auxiliary services

By

Edgar H. Felix

Developing Private Air Travel

ORGANIZED air transport has lately somewhat overshadowed private flying. Rapid increase in the magnitude of passenger carrying and mail operations has been accompanied by systematization of maintenance and inspection service, which contributes so greatly to safety and reliability, expansion of meteorological services and associated communications facilities. Airports are increasing both in number and standard. Airway mileage is already equal to one-tenth of the country's state highway mileage.

All of these elements contribute to the practicability of private flight. This field of activity is largely limited to sportsmen and to the personnel of corporations which maintain planes for publicity and special transport purposes. Every day, progress is made in the direction of simplifying private flying and increasing the desirability of plane ownership. Although this field is still restricted by cost and lack of convenient service facilities, it is far from enjoying the fullest possible development at this time. The extension of this potential market for aircraft offers, in the end, the greatest possibility for increasing the volume of aircraft manufacture in spite of its smaller unit of sale.

The layman, unaquainted with the details of aircraft operation and maintenance, has the conviction that some day planes will be as numerous as motor cars. Those who have tasted of their first flight are infected with the germ and impatiently await the day that planes are sufficiently inexpensive and flying reliable enough to warrant the purchase of a plane for family travel and pleasure. To them, the day seems far off before the airplane is sufficiently "perfected" and inexpensive to make it the vehicle of the conservative man of family.

The completion of airport and airway facilities is rapidly making air touring easy and enjoyable. Planes are already available at costs so low that thousands of the well-to-do are potential buyers. The movement to establish aviation clubs is the most practical step in the direction of winning recruits to private flying. Perhaps it is a little early to look for real expansion in this direction, but ultimately private purchasers will be the biggest customers of the aircraft industry. Air travel is too alluring to remain principally in the field of organized transport and taxi service. The real thrill comes at the stick, and the general public will not be denied.

Because of this, the organization of airport and airway facilities may some day need substantial alteration to meet entirely new conditions. Accommodations for thousands of planes, instead of a few score, may be required at every airport. The private flier will need an inspection and maintenance service which is in no respect inferior to that now organized by air transport operators. Airport regulation may need modification or private flying may have to be segregated completely from the transport airport.

There are thousands of half developed prospects for the purchase of private planes. They require only a knowledge of the service facilities now available and data as to costs of operation to become actual purchasers. It is up to the makers of the smaller types of aircraft to stimulate this market by answering the questions which make potential buyers hesitate to buy. It is of as much interest to these prospects to know of the facilities available for the maintenance of planes, the cost of operation, the time required to learn to fly, the growing airport facilities and the development of airway mileage, as it is to be informed of the landing, cruising and top speeds of planes, their passenger carrying capacity, and the flyaway price. The aviation market today may be only a small fraction of the automobile market, but it is certainly considerably larger than is realized outside of the industry. Why not let the public know that the day of the private flier is here?

Boeing to Inaugurate All-Air Transcontinental Service

BOEING AIR TRANSPORT will extend its Chicago-San Francisco passenger service all the way to New York next fall. Eighteen-passenger Boeing transports, powered with three 525-horsepower engines, will be used and will make the trip in less than 20 hours. Although some 2,800 passengers have been carried during the twenty months that the Chicago-Frisco run has been in charge of the company, provision has been made for only two passengers on the mail planes employed. These planes have carried more than 750 tons of mail and express in that period. When the passenger service goes into operation, a new type of mail plane will be put in service. It will have a capacity of four-fifths of a ton, a top speed of 142 miles an hour and no provision for carrying passengers.

The multi-motored Boeing transports, of the type to be used for passenger service on the Chicago-Frisco route, are already being employed between Salt Lake City and San Francisco. Seats are arranged within the cabin in six rows of three each, two seats on the left of the aisle and a single seat on the right. Aft of the main cabin is a cloak room and a well appointed lavatory with provision for hot and cold running water. A small buffet, from which light lunches are served, is also a feature of equipment. The transport will have a gross weight load of eight and a half tons and a high speed of 135 miles an hour. This service involves no rail tie-up and is to be the longest regularly flown air transport route in the world.

United Aircraft and Transport Corporation, of which Boeing is a subsidiary, has acquired Stout Airlines, thereby providing a fully established organization of the new route from Cleveland, via Chicago to San Francisco. Arrangements have not yet been completed for the New York to Cleveland jump. The entire route is fully lighted with rotating beacons, fixed beacons and blinker lights. Planes will be equipped with the latest radio equipment.

(*Continued on next page*)

P. & A. Photo

Chicago's downtown amphibion and seaplane base used by the Curtiss Flying Service for its shuttle service.

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BRADFORD PA

KINDLY ACCEPT OUR HIGHEST ENDORSEMENT FOR YOUR KENDALL J OIL WHICH WE USED THROUGHOUT OUR ENDURANCE FLIGHT OF ONE HUNDRED SEVENTY FIVE HOURS FIFTY NINE SECONDS STOP WHEN THE WRIGHT MOTOR WAS TORN DOWN FOR COMPLETE CHECK UP WE FOUND ALL WORKING PARTS IN PERFECT CONDITION DUE TO THE FACT OF PROPER LUBRICATION STOP WE WISH TO GO ON RECORD FOR SAYING WE BELIEVE YOUR KENDALL J OIL SUPERIOR TO ANY OIL WE HAVE USED IN THE PAST STOP IT IS OUR INTENTION TO TRY FOR ANOTHER WORLDS RECORD ENDURANCE FLIGHT AND YOU MAY REST ASSURED YOUR OIL WILL BE USED AGAIN STOP CONGRATULATING YOU ON THE SPLENDID QUALITY OF YOUR PRODUCTS WE ARE RESPECTFULLY YOURS

STEWART AIRCRAFT CORPORATION
H R REITZ OPERATIONS MANAGER

175 hours at Cleveland..and still —NO ONE KNOWS HOW LONG

a Kendall-lubricated engine could keep on running

For 175 hours, 59 seconds, the Wright Whirlwind J-5, 220 H.P. motor in the "City of Cleveland," held to its task without faltering and apparently without effort—Kendall lubricated. That it could have kept on much longer everyone agrees—how much, no one knows.

When the motor was torn down after the record-breaking flight for complete check-up, all working parts were found to be in perfect condition "due to the fact of proper lubrication" as reported in the telegram from Mr. Reitz, of the Stewart Aircraft Corporation. Due also largely to "proper lubrication" the motor completed 16,700,000 revolutions during the flight with an average gas consumption of 11 gallons per hour instead of the usual 14.

Byron K. Newcomb and Roy L. Mitchell, who piloted the Stinson-Detroiter for more than seven days, a good part of the time under severe weather conditions including one storm of twelve hours' duration, announce their intention to try for a new world's endurance record—again with Kendall Oil.

It pays to use Kendall Oil, not just for the races or for special endurance tests, but all the time. Derived entirely from the Bradford grade of Pennsylvania Crude, Kendall has the natural stamina that heat and speed cannot destroy, that keeps the motor running without friction, cool, safe, even when wide open. It insures substantial savings in fuel, less frequent draining intervals, longer periods between overhaul.

Users of Kendall Oil are destined to make further aviation history before the summer is over. *For a list of Airports where Kendall Oil is now obtainable, address Aviation Division, Kendall Refining Company, Bradford, Pa.*

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**REFINED FROM 100% BRADFORD
GRADE OF PENNSYLVANIA CRUDE**

{ See Our Exhibit at the National Aeronautical Exposition, Cleveland, Ohio, August 24th to September 2nd }

Hamilton Metalplane of the Isthmian Airways, operating in the Canal Zone.

(Continued from preceding page)

Boeing is also surveying its proposed route between Seattle and Juneau, Alaska. Five-passenger Boeing flying boats will be used and will cover this trip in eight hours as compared with the four days required by boat.

The New York-Mexico City Air-Rail Service

THE Mexican Aviation Company will establish an international air-rail service between New York and Mexico City. Passengers will leave New York at night, arriving by rail at Greensboro, N. C., in the morning. At that point Southern Air Transport planes will take them to Houston, Texas. From there they will proceed by rail to Brownsville, then by Mexican Aviation Company planes to Mexico City, arriving at 2 p. m. the second day after leaving New York. Returning passengers leave Mexico City at 7:45 a. m., arrive at Brownsville at 1 p. m. An overnight rail trip will bring them to Houston, a day's air journey from Houston to Greensboro, and finally they will arrive at New York by rail at 9:53 a. m. the second morning after departure. It is understood that the Missouri Pacific and the Seaboard Air Line will be the railroads participating. The fastest trains now require nearly five days for the trip.

THE PASSENGER LINES

Heavy Passenger Traffic on Coast

THE Maddux Air Line, a Transcontinental Air Transport unit, Western Air Express and West Coast Air Transport carried 13,895 passengers out of a total of 18,971 carried by all operators during the last six months of 1928 along the Pacific Coast. These three lines carry the heaviest traffic of any air passenger services in the United States. The Maddux company led the others for the six months' period, having carried 6,255 passengers between Los Angeles, San Francisco, San Diego, Agua Caliente and Palm Springs. Western Air Express, operating between Los Angeles and San Francisco, Salt Lake City, Avalon, Pueblo and Cheyenne, carried 4,614, and West Coast Air Transport between San Francisco, Portland and Seattle, carried 5,026 passengers.

T. J. C. MARTYN, staff correspondent of the New York *Times*, has been making a trip throughout the country on regular air transport lines as a study of the status of commercial flying. After traveling 4,000 miles, he experienced at Portland, Oregon, his first failure to obtain passage because passengers had already been booked to the capacity of the plane. He found this situation obtaining with the Pacific Air Transport service from Portland to Seattle. Reporting on the San Francisco to Portland jump, 723 miles, he stated it required 17 hours by fastest train and that airplane travel cuts off almost half a day in time. He further states that this is the only line in America which is competing with the railroads on their own terms, the air fare charge being approximately equal to railway fares.

T. A. T. Takes No Chances

AS an example of conservative precaution, Transcontinental Air Transport, before publicly inaugurating the New York-Los Angeles air-rail service, required its staff of 36 pilots to maintain their regular schedule for ten days. This followed two years of work in preparing fields, aircraft, communication systems, and even building highways to connect the fields with nearby centers of population.

Record Mileages Made

THE total mileages reported by the Department of Commerce for the last half of 1928 for National Air Transport was 1,179,385; Boeing, 1,065,952; Western Air Express, 575,532; Pacific Air Transport, 329,603; Texas Air Transport, 275,376; Maddux, 272,256, and Pitcairn, 262,369.

Ludington's Week-End Service

THE Ludington-Philadelphia Flying Service, Inc., has begun a service between the Camden Airport near Philadelphia and Woods Hole, Mass., on a week-end basis. A four-passenger Travel Air leaves Friday afternoon and returns to Philadelphia on Monday morning.

AIRPORT AND AIRWAY DEVELOPMENTS

Subsea Plateau to Aid Seadrome

THE discovery of a subsea plateau almost exactly midway between New York City and Bermuda, which has been charted by the Naval Hydrographic Office survey ship *Hannibal*, is helpful in connection with the mooring of the Armstrong drom which is now under construction at Chester, Pa. The average depth of the plateau is 12,000 feet, and it rises 3,600 feet above the surrounding ocean floor. The shelf lies approximately at 68 degrees west longitude and 36.40 degrees north latitude. It is at a point almost on a line between New York and Bermuda, 400 miles from New York and 375 from Bermuda. Tests show that beneath 16 to 18 inches of ooze on the ocean floor lies a solid bank of red clay, an ideal bottom for anchorage purposes.

New Low Rate Air Taxi Service

THE Roosevelt Flying Corporation, operating subsidiary of Roosevelt Field, Inc., has announced a drastic cut in taxi-plane charges to 25 cents a mile per passenger for parties of two or more to any point in the United States. No charge is made for returning the plane without passengers.

Fairfax's New Beacon

FAIRFAX FIELD, Kansas City is being equipped with lighting facilities by the Graybar Electric Company. Included is an 8,000,000 candlepower rotating beacon, a directional searchlight, a ceiling projector, wind sock lighting fixture and a series of cone type boundary lights. A mechanism will flash "FAX" in code to identify the beacon.

Two Billion Candlepower Lindbergh Beacon Gets Permit

THE Department of Commerce has approved the installation of the 2,000,000,000 candlepower beacon atop the new Palmolive Building in Chicago. The light is to be known as Lindbergh Beacon and is the most powerful of its kind in the world. Illumination is provided by a 150 to 250 ampere high intensity arc. It will rotate three times per minute. The Lindbergh Beacon will be located ten and a half miles from the Chicago Municipal Airport.

Sixty New Weather Reporting Stations

THROUGH the $350,000 appropriation for weather reporting service which became available on July 1, a more extensive weather reporting and forecasting service is being provided by the Weather Bureau along the New York-San Francisco-Los Angeles transcontinental airway. Broadcasting of flying weather reports is now on a three-hour schedule day and night. A new net of 60 weather reporting stations, covering a strip 400 miles wide along the transcontinental airway, bases these reports on much more comprehensive information than was available in the past. The four collecting centers to which the reports are

(Continued on next page)

Sky Harbor

The Finest Flying School

Every facility for thorough flying training is offered at Sky Harbor, the model airport of the Middle West.

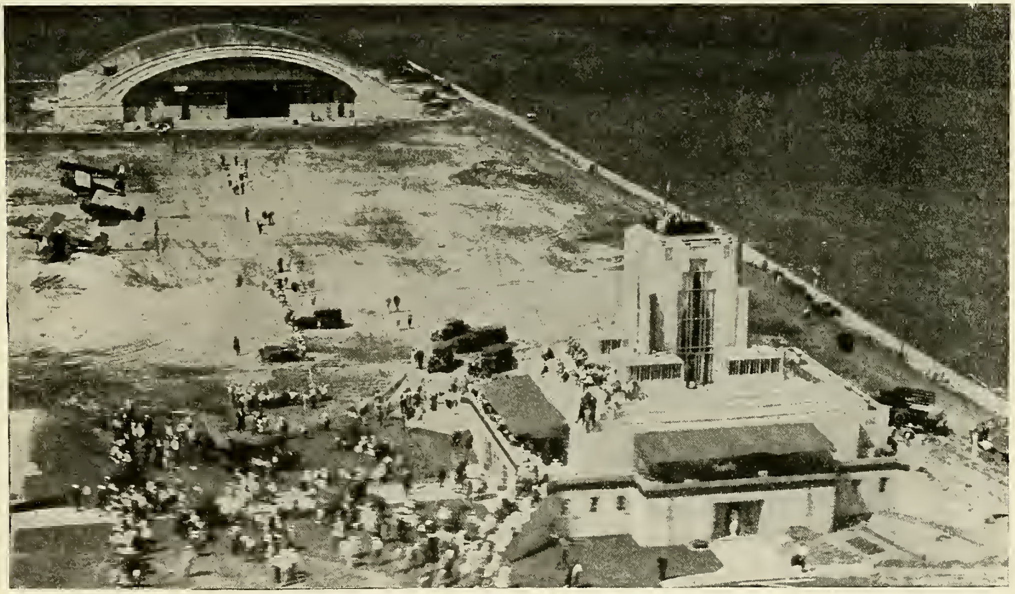
This modern school will give you individual instruction by Government licensed transport pilots who have been carefully selected for their experience, character and ability to teach.

Sky Harbor has been built to conform to the Department of Commerce requirements for an A. I. A. rating.

The "Fleet" training planes, similar to Army student planes, are noted for reliability and safety.

Sky Harbor is not just a flying field. Sky Harbor is an air terminal—a model for the airports of the future. It is located on Chicago's famous North Shore—4 miles west of Lake Michigan.

There are long cinder and turf runways in all directions with no obstructions of any kind. Beautiful, modern buildings provide every convenience for students. Flying is taught here under ideal conditions. Training equipment includes Ford Tri-Motor, Fokker Super-Universal, Laird and Fleet.



GRAY GOOSE AIR LINES, INC.

105 WEST ADAMS STREET, CHICAGO · FRANKLIN 9740

Sales Representatives for

FLEET — STEARMAN — FAIRCHILD

(*Continued from preceding page*)

sent are located at Cleveland, Omaha, Salt Lake City and San Francisco, from which points two-kilowatt broadcasting stations radiate them to aviators in flight.

Radio Menace Marked Near Hadley Port

WARNING beacons will be placed on the transmitting towers of radio stations WJZ and WII near Hadley Field, N. J., according to an announcement made recently. WJZ is within sight of the field, while WII is but five miles away. Considering that these towers are 300 and 400 feet high respectively, they constitute a serious menace to air navigation, particularly in their unlighted and unmarked condition, which is soon to be remedied.

Beacon and Broadcasts on Same Radio Channel

WEATHER broadcasts will hereafter be radiated from the radio telephone transmitters at Hadley Field, N. J., Bellefonte, Pa., and Cleveland, Ohio, according to F. C. Hingsburg of the Department of Commerce. The frequencies of these three transmitters are 290 kilocycles, 302 kilocycles and 286 kilocycles, respectively.

This combination of broadcasting and beacon service has been adopted as a result of the successful broadcasting of a number of emergency messages on the beacon frequencies. It makes it unnecessary for the pilot to keep track of the time in order that he may retune his receiver to pick up the weather information broadcasts.

Chicago-Frisco Radio Net Completed

THE radio communication network between Chicago and San Francisco is soon to be in complete operation. Thorp Hiscock is radio engineer for the Boeing System. Twelve ground stations are built or under construction at Oakland, Sacramento, Reno, Elko, Salt Lake City, Rock Springs, Cheyenne, North Platte, Omaha, Des Moines, Iowa City and Chicago. Additional ground stations will be located at Lincoln and Cedar Rapids. Planes will be equipped with radio telephone and telegraph transmitters.

NEW COMPANIES, MERGERS, STATEMENTS

Curtiss-Wright Will Avoid Transport Operation

THE Curtiss-Wright Corporation, formed recently to combine the Wright Aeronautical Corporation and Curtiss Aeroplane and Motor Company, will not engage in transport activities, according to Clement M. Keys, president of the new holding corporation. Although both Mr. Keys and Mr. Richard F. Hoyt, chairman of the board of the company, are active in air transport companies, the new holding corporation will devote itself entirely to manufacturing interests.

United Earns Over Three Million in Five Months

REPORTING on the activities for the first five months of 1929, the United Aircraft and Transport Corporation announced net profits of $3,327,414 in that period, after all charges including Federal income tax. Of this amount, $1,803,471 was earned in the first quarter and $1,523,943 in the months of April and May. They are the largest earnings reported by any aeronautical company for a similar period. Contributing to this income are its subsidiaries, the Pratt and Whitney Aircraft Company, the Boeing air transport lines and the Chance-Vought Corporation. Unfilled orders on May 31 totaled ten million dollars; shipments in June amounted to six million dollars. Other subsidiaries of United are the Hamilton Aero Corporation, its affiliated company the Hamilton Metal Plane Company, which in turn has acquired a controlling interest in the Stout Air Lines of Detroit.

Western Air Express Buys West Coast Air Transport

WESTERN AIR EXPRESS, of which Harris M. Hanshue is president, has acquired the West Coast Air Transport Company, an Oregon corporation, operating a passenger transport service between San Francisco and Seattle. At the former point, these lines connect with Western Air Express services between San Francisco, Los Angeles and Salt Lake City.

Bendix Buys Pioneer

THE Bendix Aviation Corporation has acquired the Pioneer Instrument Company of Brooklyn, N. Y., makers of every type of airplane indicating instrument. Its general manager, Charles H. Colvin, reports that Pioneer will do a business of more than $1,000,000 in 1929 and will soon occupy a new factory of 60,000 square feet floor space. In the first few months of 1929, sales were materially greater than for any previous six months in the company's history.

Lorillard Spencer Consolidates Lake Placid Air Services

AVIATION CONSOLIDATED, INC., has taken up several aviation projects which have been operating in the vicinity of Lake Placid and acquired 198 acres of land in order to create a first class airport at the summer and winter resort. Mr. Lorillard Spencer, one of the organizers and former president of the Fokker Aircraft Company, is president of Aviation Consolidated, Inc. The company has acquired exclusive air landing rights to all Hudson River Day Line docks and, through subsidiary companies, plans are under way for a national aviation training institute for women at Lake Placid and Palm Beach, a national aviation camp at Plattsburg, N. Y., and a junior training school for boys under sixteen at Lake Placid. The new field is to maintain service between 9 a.m. and 8 p.m.

AIR MAIL NOTES

Air Mail Poundage Reaches Record Total

ALL records were broken in the transportation of mail by air over domestic routes during May, according to figures made public by Postmaster-General Brown.

A total of 587,471 pounds were carried over 24 routes during the month, a daily average of 18,950, as compared with 508,672

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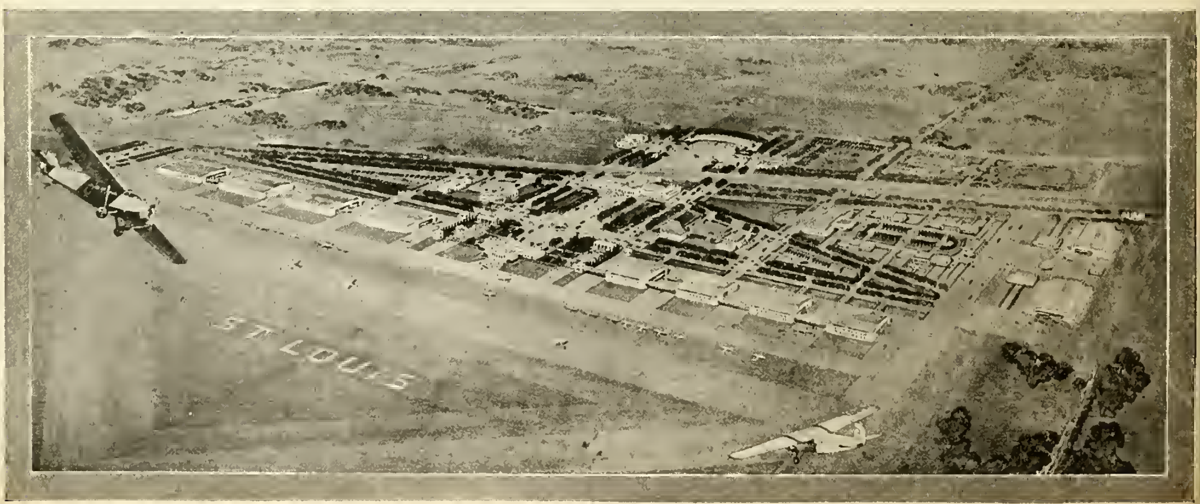
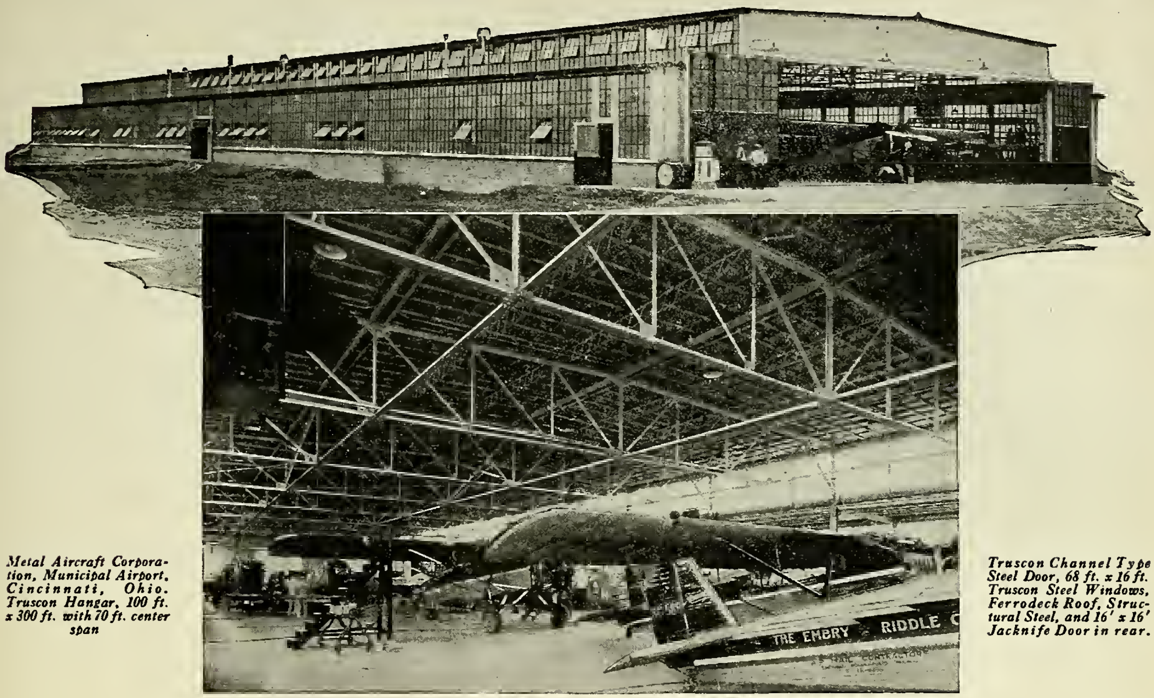


East St. Louis air terminal being constructed for Transcontinental Air Transport and Curtiss Flying Service.



Metal Aircraft Corporation, Municipal Airport, Cincinnati, Ohio. Truscon Hangar, 100 ft. x 300 ft. with 70 ft. center span

Truscon Channel Type Steel Door, 68 ft. x 16 ft. Truscon Steel Windows, Ferrodeck Roof, Structural Steel, and 16' x 16' Jacknife Door in rear.

HANGARS

MODERN—DAYLIGHT—FIREPROOF—CLEAR FLOOR SPACE—FULL WIDTH STEEL DOORS

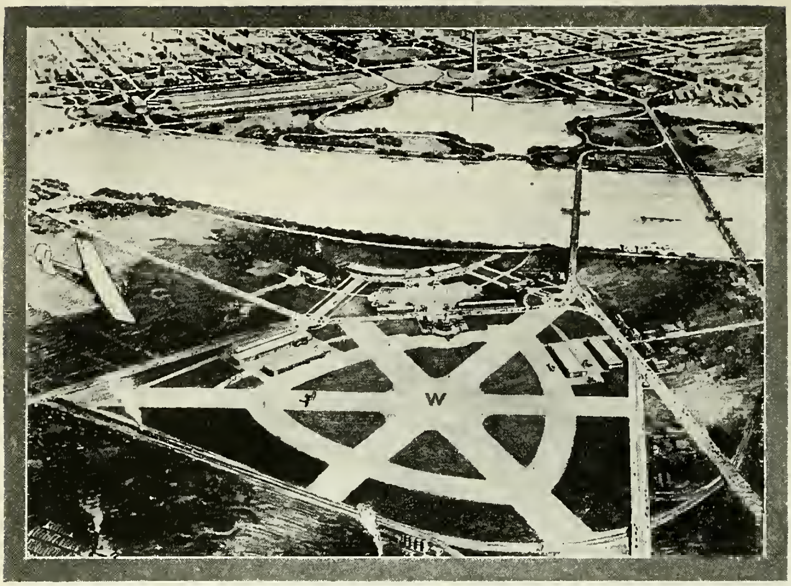
Every desirable feature in the efficient housing of airplanes is embodied in Truscon Hangars. The walls are an expanse of glass, giving daylight to every part of the Hangar. Thorough fire protection is provided by the use of Steel Windows, Steel Doors and insulated Steeldeck Roofs. The floor is entirely free of columns, permitting the easy handling of planes. The Steel Doors open the full width of the hangar so that airplanes enter and leave without interference. Repair shops are located in the side bays for maximum convenience.

Truscon furnishes you either the complete building from standardized units or the Steel Doors, Steel Windows and Steeldeck Roofs adapted to your own design. Write us your requirements so we can offer suggestions without obligation to you.

TRUSCON STEEL COMPANY, YOUNGSTOWN, OHIO
AERONAUTICAL DIVISION

Trussed Concrete Steel Company of Canada, Limited, Walkerville, Ont.
Warehouses and Offices in Principal Cities.

TRUSCON HANGARS
AND HANGAR DOORS



Proposed development of Washington Airport across from the Capital.

(*Continued from preceding page*)

for April, a daily average of 16,955 pounds. The previous high record was for December. when Christmas mails brought the air mail poundage up to 537,000 pounds. The increase for May over April was 78,799 pounds.

The scheduled daily mileage for May jumped from 30,863 to 36,334 miles as the result of the establishment of double daily service on the Chicago-San Francisco route and the establishment of a new route between St. Louis and Omaha.

The additional service on the Chicago-San Francisco route resulted in an increase in poundage on that route from 128,314 for April to 150,947 for May. The St. Louis-Omaha route produced 4,228 pounds of mail during its first month of operation.

On the basis of the May figures, at $1.83 average per pound, the year's payments to the contractors would total, for these domestic lines alone, nearly $13,000,000 as against the $7,433,166 for 1928.

Longest F. A. M. to Santiago

ASSISTANT Postmaster General W. Irving Glover has announced that the longest United States air mail route in the foreign air mail service was to be inaugurated on July 16, reaching from Cristobal, Canal Zone, to Santiago, Chile, a distance of 3,900 miles. The service is flown by Pan American-Grace Airways, a subsidiary of the Aviation Corporation of America. It provides nine and a half day air mail service between New York and Chile and eight and a half day service from Miami, the other terminus of the Pan American system. The new service will be operated weekly in each direction until additional funds for financing foreign air mail services are granted by Congress, making possible a more frequent service. Stops are made at Buenaventura, Colombia; Guayaquil, Ecuador; Lima, Peru; Arica, Chile; Canaral, Chile, and Santiago. The rate is 45 cents per half ounce from Cristobal to Chile and 70 cents per half ounce from Miami to Chile.

Detroit-Montreal Air Mail

A new foreign air mail service has been inaugurated linking Detroit and Montreal with stops at Toronto, Hamilton, London and Windsor. Canadian Airways, Ltd., is the contractor for the route.

FLYING CLUBS AND SCHOOLS

First Lighter-than-Air School Opens

THE first civilian aviation school for the operation of lighter-than-air craft has been opened at Akron under the auspices of the Goodyear-Zeppelin Company. Ground courses are conducted by the staff of the University of Akron. A course in free ballooning, requiring seven flights, the last of which is a solo, is necessary before the student begins instruction on airships. The course includes most of the curriculum covered by a transport license course with such additional physics as is necessary to an understanding of lighter-than-air craft. Subjects covered include aerostatics, dealing with the lifting power of various gases and their handling; meteorology; practical and theoretical courses on engine construction, mounting and operation; a course on navigation with instrument detail and control; free balloon design, construction and control; airship construction and maintenance; aviation history; Department of Commerce regulations; radio communication and parachute jumping. The first enrollment of 25 students are all from the personnel of the Goodyear organization.

Long Island Aviation Country Club Opens

THE Long Island Aviation Country Club opened at Hicksville, L. I., recently, the first of 114 such organizations now being formed under the national plan of Aviation Country Clubs, Inc. The backers of the project will spend more than $300,000 in clubhouse, landscaping grounds, erecting hangars and service stations. The Westchester Aviation Country Club, located near Greenwich, Conn., will be ready in a short period. Charles L. Lawrence is president of the Long Island club.

Canadian Government Subsidizes Air Clubs

THE Canadian Government is to spend $140,000 this year for the promotion of flying clubs, most of this sum to be devoted to presenting them with aircraft. Flying club membership in the Dominion is now more than 3,400 with 260 members flying solo.

REGULATING AIR TRAVEL

Curtiss Service Adds an Extra Thousand

THE Curtiss Flying Service has ordered its field managers to require that all its pilots shall fly at an altitude of at least 1,000 feet in excess of the minimum required by law in passing over densely populated areas. This order applies to all regular passenger transport and flying operations with the exception of photographic work or similar flights for special purposes as permitted by the Department of Commerce regulations. Compliance with this order in flying over New York City requires an altitude of at least 4,000 feet. The order was inspired by complaints received from persons annoyed by the noise of airplane motors.

NEW DEVICES AND METHODS

Trap-Door Parachute Demonstrated

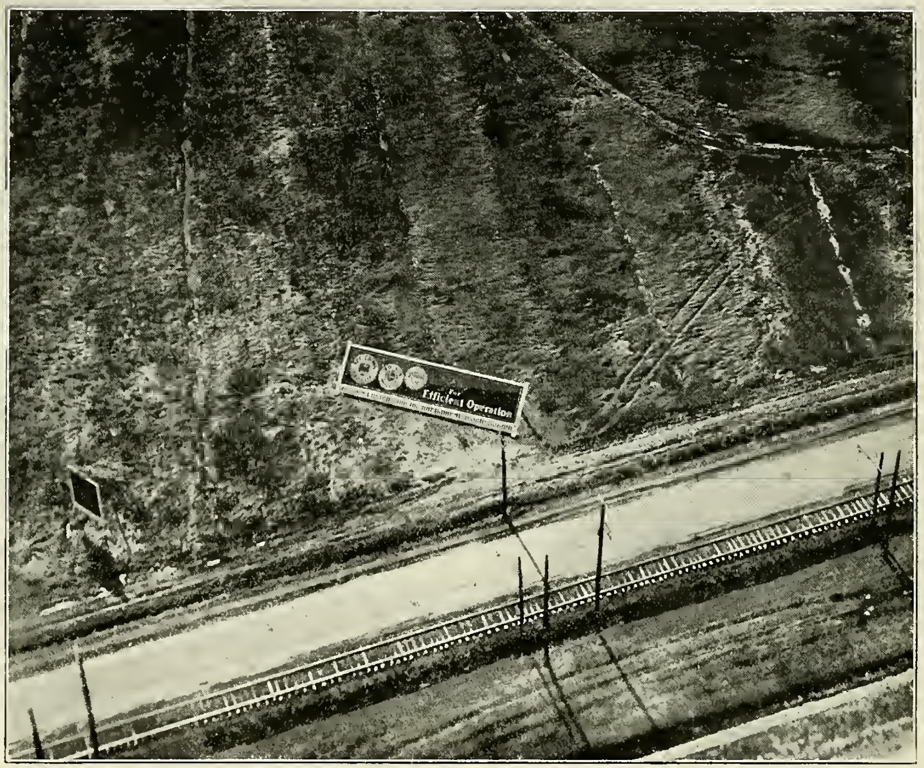
R. B. TAYLOR of Trenton, N. J., demonstrated a new type of parachute at Roosevelt Field recently. This chute is built into the passenger's seat and can be released by the pilot, the passenger dropping through a trap door in the floor of the plane. In the demonstration, the plane was put in a spin and, on the sixth turn, the pilot released the "seat pack" parachute which appears as part of the upholstery of the chair.

Planes Conquer Haytian Mosquitoes

AERIAL dusting of areas infested with mosquitoes have proved successful in Haiti, according to Consul Samuel W. Honaker of Port au Prince. The mixtures used were of one-third Paris green and two-thirds lime, one pound being used per acre. More extensive use of the treatment in exterminating mosquitoes is now being projected in Haiti.

Aid to Airport Drainage

WALKER POROSWALL rapid drain pipe has been used at Teterboro Airport, Brainard Field, Tucker Field and Bridgeport Airport for drainage purposes. Poroswall is porous throughout its entire wall area. A single length will allow 45,360 gallons of water to seep through in one day. Tight, non-clogging joints are made, resulting in rigid drain pipe lines, better flow lines and better drainage. The pipe is available in diameters ranging from four inches to six feet. It is produced by Walker Cement Products, Inc., of Little Ferry, N. J.



» » » first to recognize new condition created by Aviation

Our New Aviation Manual discusses authoritatively and impartially airplane motors, aero gasoline and oil. It lists airports and landing fields throughout the Middle West. It gives other valuable information to aviators.

Write for your copy.

AVIATION is creating a new riding public. Recognizing the growing influence of this new public, the Standard Oil Company (Indiana) has created something novel in outdoor advertising. A large bulletin board erected near Detroit has been constructed at a 45 degree angle so that it may be read from the air as well as from the ground.

The Standard Oil Company (Indiana) has long been a pioneer in Aviation. Years ago it began the development of fuel and motor oils for airplane service. From the early days of flying Stanolind Aviation Gasoline and Aero Oils have been giving outstanding service. With thousands of flying hours to their credit never have they been guilty of causing engine failure through faulty combustion or improper lubrication.

These tried and proven aviation products are available at most airports throughout the Middle West. Ask for Stanolind Aviation Gasoline and Aero Oil at your flying field. You'll get the smoothest, most dependable combination of fuel and lubricating service that gasoline and oil can give.

STANDARD OIL COMPANY (*Indiana*)

General Offices: 910 South Michigan Ave. Chicago, Illinois

Chicago
Davenport
Decatur
Des Moines
Detroit
Duluth
Evansville
Fargo
Grand Rapids
Green Bay
Huron
Indianapolis
Joliet
Kansas City
La Crosse
Mankato
Mason City
Milwaukee
Minneapolis
Minot
Saginaw
Sioux City
Peoria
Quincy
South Bend
St. Louis
St. Joseph
Wichita

320

AIRPORT ENGINEERING

By John Bonforte, *President of Bonforte Airport Engineering Corp.*

SPECIALIZED airport engineering is needed to develop good airports. But the term "airport engineering" is so new that its meaning is apt to be somewhat loose, its application general, and its abuse by self-seekers very wide. Airport engineering is not a brand new science or business, but only a profession combining portions of the older engineering sciences in a new application.

In the absence of any accepted definition of airport engineering, the following is submitted:—

Airport engineering is the profession that combines the existing knowledge of civil, mechanical, and electrical engineering, and applies them efficiently in the preparation of an area for landing field use.

The broad scope of this definition of airport engineering necessitates that the airport engineer possess the qualities of a chief engineer with the flier's knowledge of a desirable landing field area; the city planning expert's knowledge of city growth; the civil engineer's knowledge of surveying and topography; the soil specialist's knowledge of drainage and of sod growth; the highway engineer's knowledge of road materials and of road building; the construction engineer's knowledge of building; the electrical engineer's knowledge of the proper distribution of lighting; and the architect's knowledge of planning for present needs and future growth.

The problems confronting the airport engineer can be roughly divided into four classifications—selection, planning, construction, and lighting.

The selection of an airport site should include consideration of the following:—

Probable users of the field.
Geographical location of the city.
Topography of the site and of the airways leading to the airport.
Local weather conditions.
Area and the shape of the airport.
Surrounding obstructions.
Accessibility to the site by highways and railroads.
Availability of electricity, telephone service, and water.
Drainage and nature of soil.

Probable users of an airport site determine largely and sometimes entirely the proper selection of an airport site. The probable users of an airport can be classified as follows:

Air mail, express, and freight carriers; passenger carriers; flying school operators; service operators; and joy riders.

Each of these users of a landing field has a different main requirement.

An airport suitable to an air mail, express and freight carrier should consider primarily the airway of which it is a terminal or depot.

The inter-city passenger-carrier's airport should consider primarily its connections with the highway or railroad transporting the passengers to the airport.

The flying school field should be located where ample level area is available with few surrounding obstructions and should be available to some nearby community by a good road.

The service operators' field should be located primarily with a view to its availability to the business section of the community which it is serving.

The joy riders' field can be located anywhere that a crowd can be attracted and must have adequate parking space. And if a dance floor is provided all conveniences may be forgotten.

Local weather conditions should be given careful consideration in the location of an airport. There are sometimes small local areas in parts of the country which are frequently enveloped in fog due to the proximity of a lake, a marsh, a river, or the ocean. There are also areas in the country which are subject to peculiar local wind conditions. There may be winds which nearly always are blowing from one or two directions, or winds that blow incessantly and strong, or winds that fluctuate widely, causing the formation of eddy currents. No airport should be selected and no airport layout should be planned without careful study being made of the wind conditions.

Although the area and shape of various airports may differ widely, each may equally be efficient. On the other hand, certain airports may be very similar and yet vary greatly in suitability. The area and shape of an airport is only one of the factors entering into an airport selection; and for this reason, it alone is not a criterion of the worth of an airport.

Airport drainage and the nature of the soil are two factors in airport selection which should also be given very careful attention. An airport that is excellent in summer and a marsh in spring cannot be expected to serve as an industrial center.

The above gives a general idea of the varied nature of the problems encountered in the selection of an airport.

The planning of an airport depends primarily upon the use for which it is intended. One important consideration in airport planning is the possibility of its use for night flying. Night flying increases the safety requirement of an airport as night automobile driving increases the safety requirements of a highway. Obstructions which seem minor in the daytime, may become hazardous at night time.

The airport layout should, in turn, consider the prime use of the field, the runways and landing area, the obstructions about the field, the location of the structures to be erected immediately and in the future, and the location of roads and parking space.

The location of the buildings at an air port depends upon so many other considerations that their position is frequently determined by these considerations, if sufficient careful forethought is given to them. A few of these predetermining factors are: first, the approaches to the field; second, their availability and proximity to the highway; third, the location of existing obstructions; and fourth, the direction of the electric feeder lines. This last is an important point which is sometimes overlooked, necessitating the stringing of overhead electric lines around a border of the field, or burying them underground at considerable cost.

The value of the construction work done at an airport depends largely upon the care and ability exercised in making the airport plans.

Airport lighting is a new application of industrial lighting, and like it, airport lighting may enhance or impair the utility of the airport. An airport should have the usual night light equipment described by the Government; that is, a strong, distinctive beacon, field and obstruction lights, a ceiling light and floodlights. Floodlights are required for field and hangar illumination. A single source of light for floodlighting is preferable to scattered sources of lights, because it is easier for the eye to accommodate itself to the uniformly graduated light from a single source than it is to accommodate itself to the uneven distribution of light from scattered sources.

At least one hangar should be illuminated by floodlighting. The same thought regarding having a single source of light, rather than a group of lights, applies to hangar illumination as well as to field illumination. Scattered goosenecks along the eaves and ridge of a building are an ineffective and insufficient means of lighting a hangar. A more efficient method is to floodlight the roof by two or four floodlights mounted at short distances from opposite corners of the roof.

At this point it is desired to summarize and limit the meaning of the word *airport.* The term *airport* should be limited to those flying fields, properly located, having a prepared surface of sufficient area to permit the safe landing and take-off of the largest airplanes, carrying their maximum loads, by day or night, in all directions of the prevailing wind currents for that locality; and providing the following accommodations:

A maximum 30-minute traction or automobile service to the heart of the community being served.
Good telephone and telegraph service.
Ample water supply for drinking, sanitary field service, and fire prevention use.
Ample hangar space for the largest airplanes, containing lighting, heating and repair equipment.
Electric fueling service.
Efficient field and floodlighting system.
Day and night field service.

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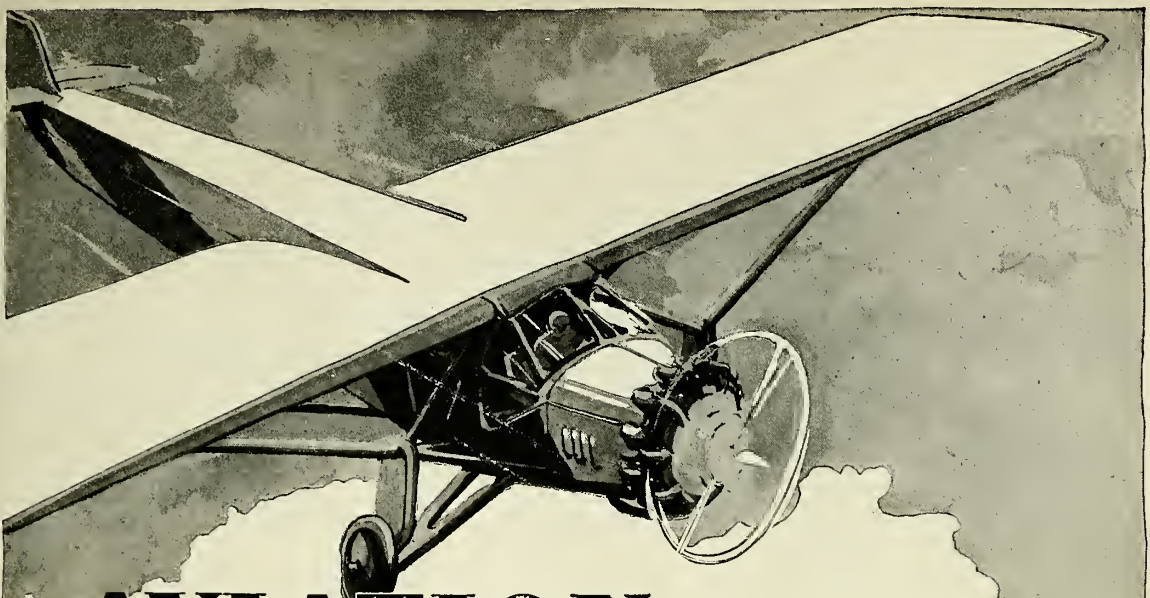


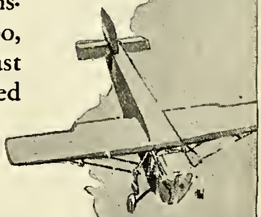
AVIATION
is headed toward ST. LOUIS

Have you noticed what is going on in Aviation in the Middle West? How one after another of the leading manufacturers, the great organizations, are locating in the Mid-West center that offers such ideal advantages for increased activities?

Not many months ago, the makers of the famous Ryan ship that Lindbergh flew, moved plants and facilities to St. Louis... Here, too, came Curtiss, recently, forging a master link in its national chain of manufacture, service, and instruction... Here has come the marvelous "Wright" Engine, bringing clocklike dependability to Western craft... Here came "Universal"; supplying, among its other services, reliable airplane transportation to everywhere... The Transcontinental Air Transport, too, combining rail and air from Coast to Coast, has recently established its headquarters here.

...the center of the nation; a 50,000,000 population within 500 miles; favorable flying conditions; a level country; an "all-year" climate; the facilities of a big manufacturing city—these are weighty facts. Facts and advantages that apply with growing force to *any* business concerned with Aviation—the new industry now so strongly headed toward **ST. LOUIS**

the NATURAL center of Aviation



In St. Louis

1929—Gordon Bennett Balloon Races

1930—National Aircraft Show

"Shipments F. A. St. L." (Flyaway, St. Louis) means arrival at destination within 5 hours anywhere inside the 500-mile St. Louis Circle, whose population exceeds 50,000,000 people.

Condensed, accurate facts regarding Aviation opportunities in the St. Louis District, or a special survey, if desired, may be had by addressing Dept. A-3, Industrial Bureau of the Industrial Club, 511 Locust Street, St. Louis, Missouri.

INDUSTRIAL BUREAU OF THE INDUSTRIAL CLUB OF ST. LOUIS

(Continued from preceding page)

Weather communication office.

Radio receiving and sending station.

The writer feels that in one form or another, all of the above has been written and said many times previously. If the value of this paper is judged solely upon the worth of its technical content, its main hope of value lies in the effort that has been made to enumerate the various airport problems and to evaluate each. Yet, this is only one of the purposes of this paper.

The other and perhaps more important purpose of these remarks is to point out the reasons for the inadequacy and expensiveness of so many airports, and to indicate a way that may lead to their improvement. The reasons for inefficient airports are: the general lack of knowledge of airport engineering; the wide-spread belief that well-known aviators are experts of everything aeronautical, including airport engineering; the diversified control of airports by municipal and civic bodies, which canot profit by early experiences, because they only control one airport; and the lack of experienced personnel in airport engineering.

The future remedy for the proper development of airports perhaps lies in government supervision. This supervision is coming very rapidly. But, instead of airport development and maintenance supervision being conducted by the Federal Government, as is the case with practically every other phase of aeronautical work, to all present indications governmental supervision of airport legislation, and the states, counties and county, and possibly municipal governments.

In an industry so wide-spread as aviation, such diversified control is unfortunate. However, since the Federal Government will not interest itself at the present time in airport legislation; and the states, counties, and local government are doing so very rapidly, it is to the benefit of the entire aeronautical industry that those interested in airport legislation endeavor to make the regulatory measures as nearly uniform and helpful to the industry as possible.

Proper governmental regulation of airports should result in: a standardization of airport planning, development and lighting; the selection of air mail airports, relative primarily to the airways of which they are a part; the maintenance of airports at a minimum standard; an increased public confidence in the security of air transportation, with consequent increase of business for the reliable operators; and an increase in the number of airports as state aid is obtained for the development of airports at strategic points in communities unable to bear the financial burden of the airport.

However, legislation is at its best, only regulatory. The final solution of airport problems must lie in the hands of the airport planners and builders.

(Paper presented at the Aeronautic Division of American Society of Mechanical Engineers, February 8, 1929.)

LIGHTING OF HANGARS

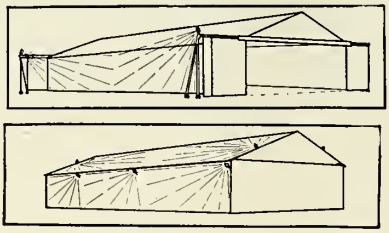
By Major D. W. Blakeslee

IN an airport, the lighting of the hangars is perhaps of as great importance as the floodlighting of the field itself. The floodlighting of only the plane surface of an aviation field, with no other things illuminated, does not give a pilot the visual information required for making a night landing. With only the field lighted, there is presented to the eye, an image of only a *flat* area, and not a *horizontal* area; the pilot must be able to get a perception of horizontal relative location of the field.

To make successful night landings, the illumination of the aviation field must present a perception of depth, which may only be obtained by perspective. This presentation of the perspective, in an aviation field where the pilot has not landed at night a great many times, is only given by the illumination of vertical surfaces in and very near the airport.

For the lighting of the external surfaces of hangars, the Department of Commerce, Aeronautics Branch, recommends the use of 10 watts per horizontal running foot of the side walls. This produces an intensity very much above that given for the required average intensity of 0.15 foot candles illumination for the surface of the landing field. The relative contrast is as desired. Some illuminating engineers who have never done any night flying are liable to recommend too great an intensity of illumination for the field. An intensity much above the 0.15 foot-candles produces too bright a light, which results in glare. The pupil of the eye of the pilot flying in the dark of the night is very much dilated, and because of the time element in the functioning of the eye, the rapidly approaching area of very high relative brightness produces a glare effect which is momentarily blinding.

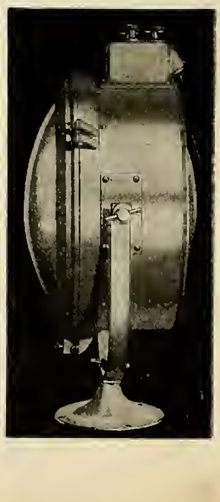
With the army type hangar, in which the doors are opened by rolling laterally to uncover entirely the end of the building, floodlights may be mounted on the end of the structure for supporting the doors. The floodlights used in such locations may be of 500 or 1,000-watt size, as determined by the area to be illuminated. A typical floodlight of the sort desirable for this application, is the "Pittsburgh" floodlight, which employs standard general service lamps. This floodlight is very efficient, for it has a one-piece crystal clear glass reflector in the shape of a two-section parabaloid. This pure silver mirror is electro-plated with copper, which hermetically seals it from the atmosphere by a method which makes it possible for the manufacturer to guarantee the reflector for 10 years against discoloration, cracking, checking and peeling of the reflecting surface.



Above: Floodlights mounted on hangar door support structure.
Below: Smaller hangar and roof lights.

With the ordinary type of hangar, upon which the lighting equipment would be attached to the surface, a smaller floodlight is recommended, such as a "Pittsburgh" floodlight for 300-watt general service lamp. For the lighting of the side walls with this floodlight, there is available a wall bracket. It may be attached to the vertical surface, close up under the eaves. These should be located thirty to forty feet apart. The same floodlight may be used for lighting the roof of the hangar.

For the illumination of the interiors of hangars, shops, etc., in an airport, it is suggested that one size and type lighting fixture be used. The unit may employ the following sizes of lamps: 300, 500, 750, 1,000 and 1,500 watts. The use of such a fixture makes it possible to obtain any illumination intensity desired. The unit illustrated employs a silver backed mirror reflector, which makes possible the projection of 70 per cent of the lamp lumens to the work plane in the 0-60 degree zone.



Left to right: Fixture for lighting hangar interiors; smaller floodlight for ordinary type hangar, with a Pittsburgh 300-watt lamp; floodlight for mounting on structure for supporting hangar doors.

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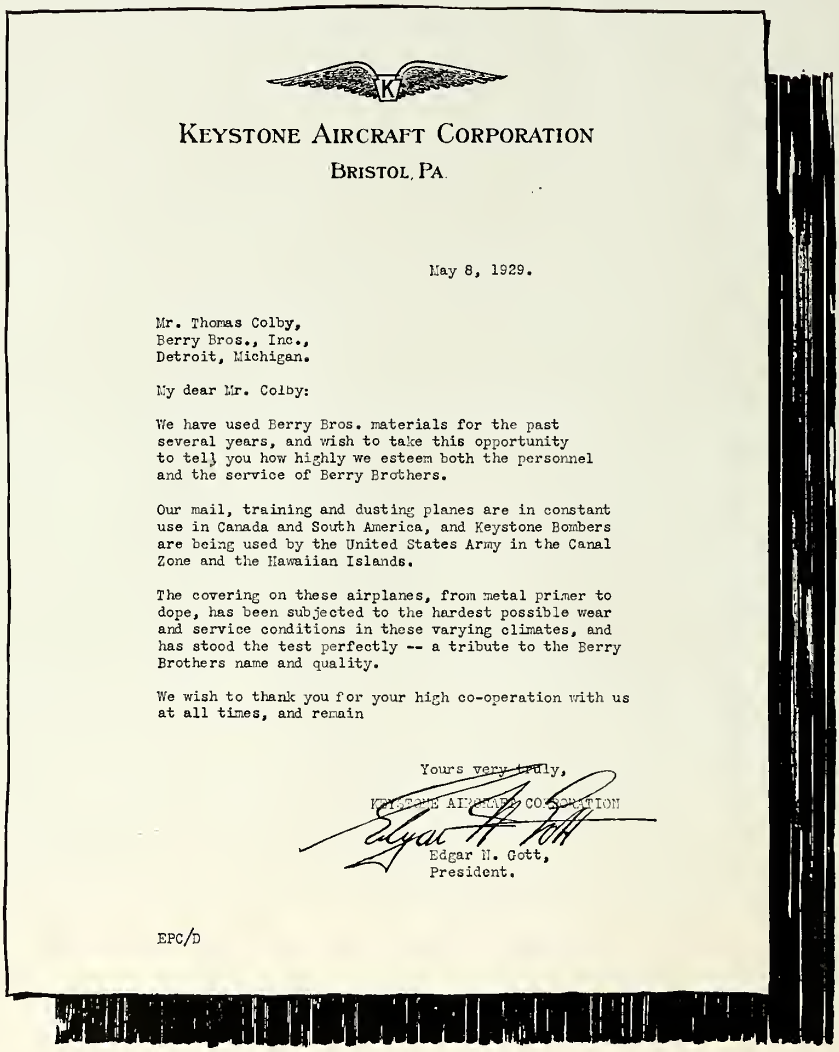

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BRISTOL, PA.

May 8, 1929.

Mr. Thomas Colby,
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My dear Mr. Colby:

We have used Berry Bros. materials for the past several years, and wish to take this opportunity to tell you how highly we esteem both the personnel and the service of Berry Brothers.

Our mail, training and dusting planes are in constant use in Canada and South America, and Keystone Bombers are being used by the United States Army in the Canal Zone and the Hawaiian Islands.

The covering on these airplanes, from metal primer to dope, has been subjected to the hardest possible wear and service conditions in these varying climates, and has stood the test perfectly -- a tribute to the Berry Brothers name and quality.

We wish to thank you for your high co-operation with us at all times, and remain

Yours very truly,
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President.

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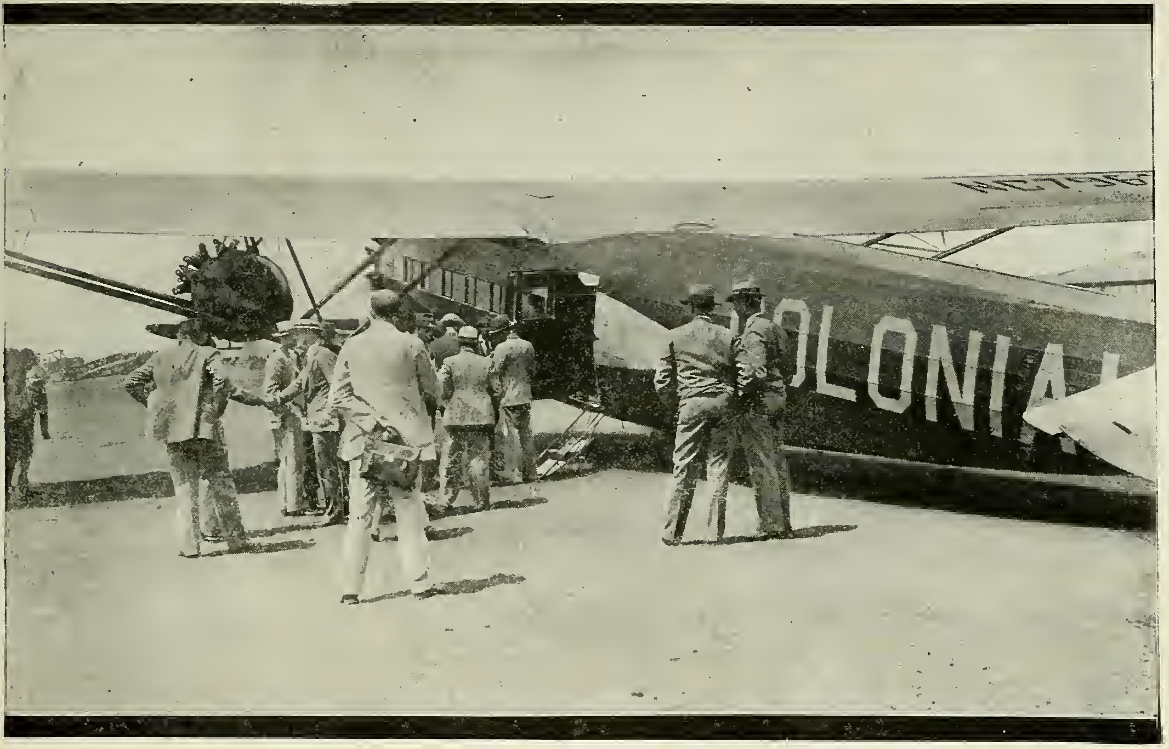


Air Transportation grows up

Above: The large scene shows passengers boarding the Keystone Patrician at the Newark Airport at the start of the daily flight to Boston on the Colonial Line.

Below: The small scene shows the capacious, beautifully appointed cabin of the Patrician.

THERE is a wise saying, "Never send a boy to do a man's job." Transporting fifteen to twenty persons on a long flight twice daily, is a he-man's job for any tri-motor. It is a job to which Colonial Air Transport, Inc. has put the Keystone PATRICIAN for the round trip between New York and Boston—205 miles each way.

At normal cruising speed and without effort, the great Keystone air liner has surpassed the best time made for the trip by other tri-motors . . . delighting Colonial patrons with its smooth, steady flight and the cheerfulness and comfort of its noise-proofed, roomy cabin.

With thirty thousand miles of airways now in operation in the United States, competent authorities agree that greater comfort for the passenger and lower rates will assure the increased use of air travel by the public. These two requirements will be fully met by the use of airplanes having the very qualities in which the Patrician today excels. Rugged construction, proven ability to sustain flight on any two engines, remarkable ease of control, give the Patrician exceptional air-worthiness. The unequalled capacity of the Patrician as a carrier results in the low over-all operating cost of 7 cents per passenger per mile.

Great air lines will achieve success with the Keystone Patrician.

KEYSTONE AIRCRAFT CORPORATION
SALES OFFICES: 31st STREET & EAST RIVER, NEW YORK
PLANTS: BRISTOL, PENNA., AND NEW YORK CITY

Distributors: NEW YORK, Cox & Stevens Aviation Corp.; BOSTON, East Coast Aircraft Sales Corp.; PHILADELPHIA, Ludington Philadelphia Flying Service; CLEVELAND-DETROIT, Thompson Aeronautical Corp.; PITTSBURGH, Pittsburgh Aircraft Agency Corp.; CHICAGO, Continental Air Services, Inc.; LOS ANGELES, W. E. Thomas; SEATTLE, Gorst Air Transport, Inc.; MONROE, LA., Delta Air Service, Inc.

KEYSTONE

"THE KEYSTONE K OF SAFE FLYING"

PREPARATION OF CLEVELAND AIRPORT FOR THE NATIONAL AIR RACES

AN airport improvement program, involving an expenditure of $450,000 and designed to afford the 1929 National Air Races the best possible landing surface, will be completed before the Cleveland air meet opens on August 24th. Of the total sum $400,000 will be spent on the landing field itself, and the remainder on air race buildings.

The task of perfecting Cleveland's 1,100-acre airport entails moving 80,000 cubic yards of dirt, laying 10,000 feet of drainage piping, surfacing runways and landing areas, and clearing away trees and stumps. When the project is finished, the field on which the air spectacle is to be staged will be uniformly level, and every safety feature that engineering talent and money can provide will be assured. All telephone and telegraph lines, as well as water and electric power channels, have been placed underground. The developments are in charge of Major John Berry, manager of Cleveland Airport, and J. J. Murray, who engineered Mines Field, Los Angeles, for the air races last year.

The air race construction program calls for a grandstand seating 30,000 people, a spacious central administration building, a contest technical station, Red Cross stations, and headquarters building for Army, Navy, Marine Corps and National Guard units.

The central building is a four-story structure, 66 by 22 feet, and of Colonial design. Cliff W. Henderson, managing director of the races and exposition, will have his suite on the second floor. This floor will also provide rooms for secretaries to the air race officials and a gallery from which they may view the races, contests and the handling of traffic.

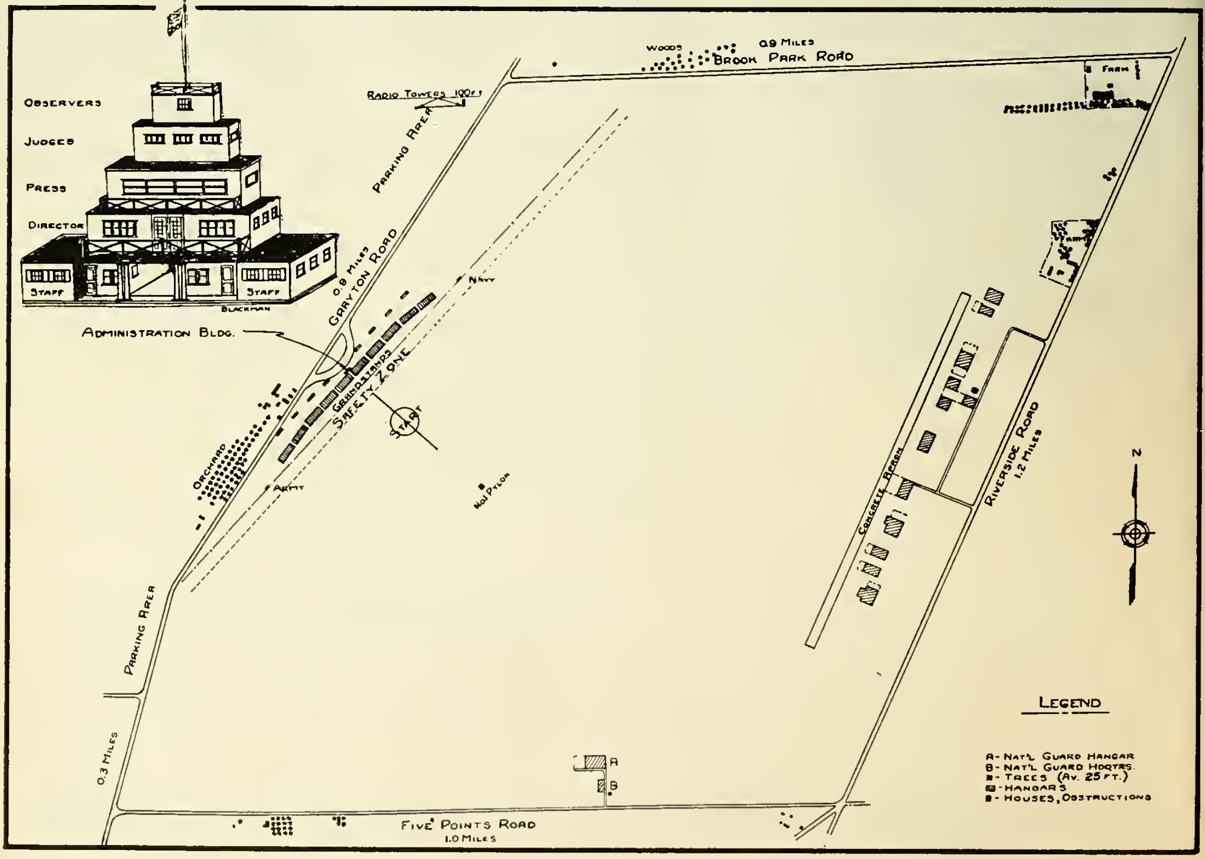
The ground floor has been set aside for the contest committees, engineering activities, accounting, tickets and concessions. An arcade through the center of the building will permit visitors to pass from the main airport entrance to the grandstand.

Representatives of the press and radio broadcasters will have the entire third floor. Facilities for disseminating news will be assembled there. The press floor will contain a dark room where camera men may develop their photographs. For the staff of radio announcers, who will furnish a running account of the flying events for a nation-wide hook-up of stations, a separate soundproof studio has been provided.

Floyd J. Logan, air race chairman, will have his headquarters on the fourth floor. This section of the building will serve as the focal point of air race and contest activities. Rooms have been set aside for the various contest chairmen, judges, referees, timers and the entire air race staff, working under the direction of Mr. Logan. This floor also has been provided with an open portico designed to give the officials a clear and unobstructed view of the races. An observation tower caps the structure, and this vantage point also will be used by officials and their guests in watching the progress of the flying meet.

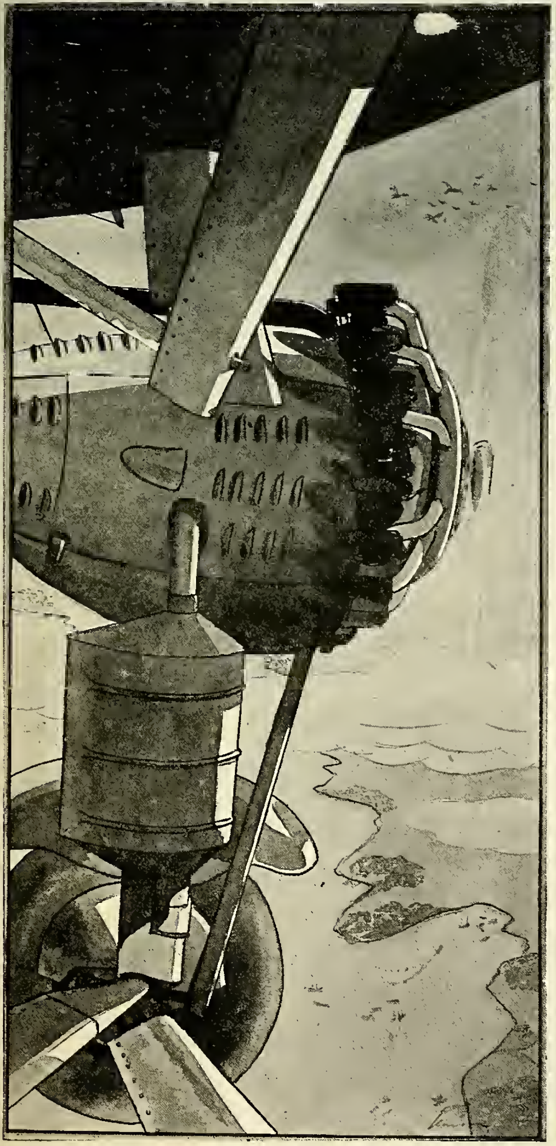
TO permit pilots who visit Ann Arbor to have their planes serviced quickly, the Flo Flying Services, Inc., operating the Ann Arbor municipal airport, has designed a service sheet which provides spaces for practically every service requirement.

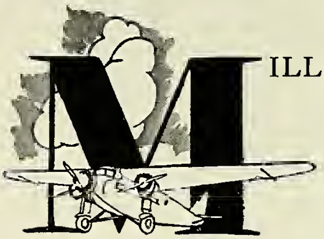
When a plane lands an attendant immediately writes up its entry on the service sheet, making a complete record of its identifications. The attendant then notes from the pilot what servicing the plane requires and what time the pilot wants to take off. These items are all checked and the service sheet turned over to the service manager who has an accurate record of all work to be done. The pilot may leave the field within two minutes after landing. In calling for the plane, the pilot receives a duplicate of the service sheet.



Layout of the Municipal Airport at Cleveland, Ohio, for the 1929 National Air Races.

THE NAME OF WRIGHT IS ONE OF AVIATION'S ASSETS





MILLIONS of men have yet to fly. Some will never do so. But as succeeding thousands come to decide that they will ride the air the name of Wright is one of Aviation's assets.

For in the minds of millions the name of Wright . . . the reliability of Wright . . . the endurance of Wright . . . give confidence and courage to the neophyte of the air when for the first time, he sweeps upward in the skies.

The name of Wright is one of aviation's assets. It is so not to the lone benefit of ourselves, but to every man who builds a plane—to every man who takes his living from the air. For the job of all of us in aviation is to build this kind of confidence; to work together as business men should; to take from aviation its heroic tinge, and to clothe it with confidence and every-day reliability.

Last year set a new record in the total of passengers carried for hire. 1929 will see more millions climb into planes for their first trips. Many more will enter flying schools. Many will buy their own planes. All are hastened in these decisions by their knowledge of Wright's proven dependability.

WRIGHT AIRCRAFT ENGINES

WRIGHT
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PATERSON, NEW JERSEY

WRIGHT AIRCRAFT ENGINES

ECONOMIC AIRPORT TRAFFIC FACILITIES

By George E. Martin

Consulting Engineer,
Tarvia Dept., The Barrett Co.

AIRPORTS are the contact points between land transport and air transport. They must be designed therefore, to care for the landing, take-off, and warming up of airplanes as well as the circulation of land vehicles carrying cargo and supplies to and from the planes. The required transport time between the airport and the point of origin or destination of the traffic should be as short as possible. To achieve this result the airport must be connected with the existing highways in such a way as to afford quick contact with the adjacent centers of population.

Since the design of the traffic carrying areas is essentially a highway engineering problem, the lessons we have learned during the evolution of our highway system can be adapted to airport traffic ways. Although certain standard types can be used in some cases, each airport should be given individual study, and the best combination of methods and materials should be selected to apply to the local conditions. At airports the economic aspect is of even greater importance than in ordinary highway work because of the large areas involved. Some of the modern projected airports contemplate paved areas as large as 900,000 square yards.

Driveways and roads within the airport area can be constructed and maintained like highways outside the area. They may be of crushed stone, gravel, or cinder construction, surface treated with cold refined tar like Tarvia-B.

Various methods for the surface treatment of these low cost types have been successfully worked out in highway practice. The object should be to get the tar down into the existing surface and form a hardened crust rather than leaving it on top to form a mat or carpet. From one-half to three-quarter gallon per square yard of cold refined tar will be required. The tar is covered with coarse sand or fine gravel to prevent picking up under traffic. Treatments of this sort are maintenance operations only and must be given the necessary attention to keep them in good condition. Such surfaces give excellent results for light traffic if the sub-grade is well drained.

Heavier traffic can be cared for by the construction of surface treated waterbound macadam roads or a penetration macadam top on a waterbound macadam base.

Where crushed stone or slag is available at a reasonable price, waterbound macadam roads can be used. Such roads are dusty and ravel out quickly under automobile traffic if the surface is unprotected. They can be surface treated, however, with cold refined tar and transformed into clean, dustless highways which will successfully carry a surprising amount of traffic.

Penetration macadam has been a standard and extensively used pavement type for almost a quarter of century. Built in accordance with modern specifications and over an adequate foundation, it will take care of any traffic which is likely to come upon it. If properly maintained, it will improve with age and be as near a permanent road as one is likely to get.

Standard highway methods can be used for the construction of aprons and warming up areas except that there must be no loose material on the surface to be drawn up in the engines by the suction from the propellers. To obtain this result, a somewhat heavier seal coat than is usual in highway practice is required. If the surface is open, part of the cover should be applied ahead of the seal coat. The final cover should be sand and it should be well rolled into the surface. All of the construction types enumerated above for driveways have been successfully used.

Runways and landing areas present a somewhat different problem. They should be smooth but non-skid, stable under varying weather and temperature conditions, easily maintained, and economical in first cost.

Drainage is a very important item always, and in some instances it may be possible by installing an adequate drainage system, to use earth runways without the addition of any surfacing materials. In most cases, however, the natural soil will be too muddy for efficient use in wet weather and too dusty in dry weather. Surfacing materials such as gravel or sandy gravel can be solidified and made dustless by a treatment with cold refined tar.

The surface to be treated should be planed with a blade grader or drag. This is a very important operation, since the surface cannot be smoothed out after the surface treatment has set up. Rolling with a light roller prior to the application of the tar will often prove beneficial. If the surface is dusty it must be swept with a rotary broom before the first application of the tar.

The amount of tar to be used will depend upon the type of material to be treated. In general as much should be used as will be absorbed, which will vary from one-half to one gallon per square yard. Not more than three-quarters of a gallon per square yard should be applied at one time. When the surface has taken all the tar it will absorb, it should be covered with just sufficient clean coarse sand to blot up the wet tar. Dragging with a bundle of brush pulled by a light truck will facilitate the drying of the tar and assist in getting a smoother surface. The sand cover should be rolled into the surface.

If the run is allowed to cure for about a week before being used, the tail skids will not cut the surface. If the runway is used when green, the tail skids may break the surface for short distances, although this is not a serious matter since the break can be quickly repaired by pouring fresh tar over it and rolling the mixture of tar and gravel back into place.

This type of dustless surfaced runway will be found to be very satisfactory where the proper conditions for its use are present.

A treatment of this sort will probably require a re-treatment using from one-quarter to one-half gallon per square yard of refined tar the second year. If it breaks up badly in the spring, the entire surface should be scarified and reshaped before the new treatment is applied. In time a sufficient depth of strengthened crust will be built up so that treatments will be needed only every two or three years.

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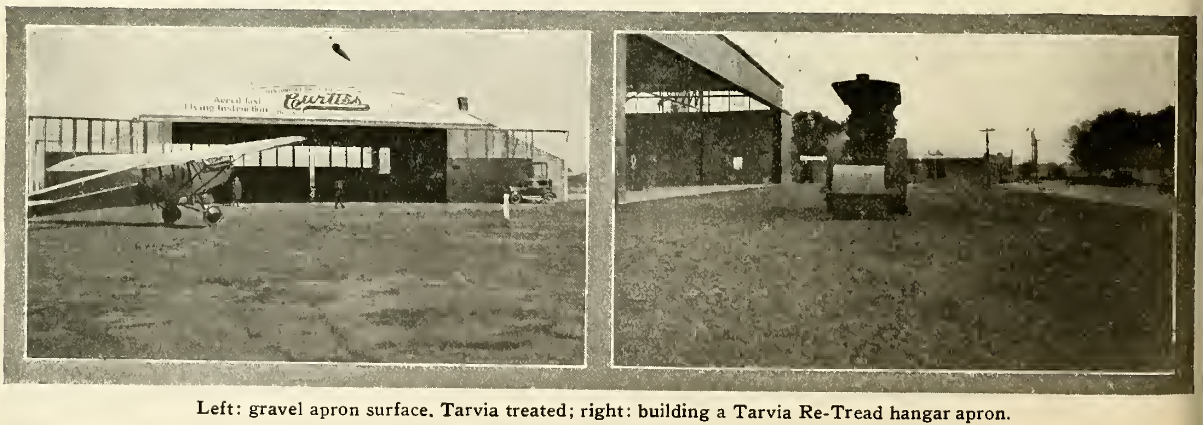

Left: gravel apron surface. Tarvia treated; right: building a Tarvia Re-Tread hangar apron.

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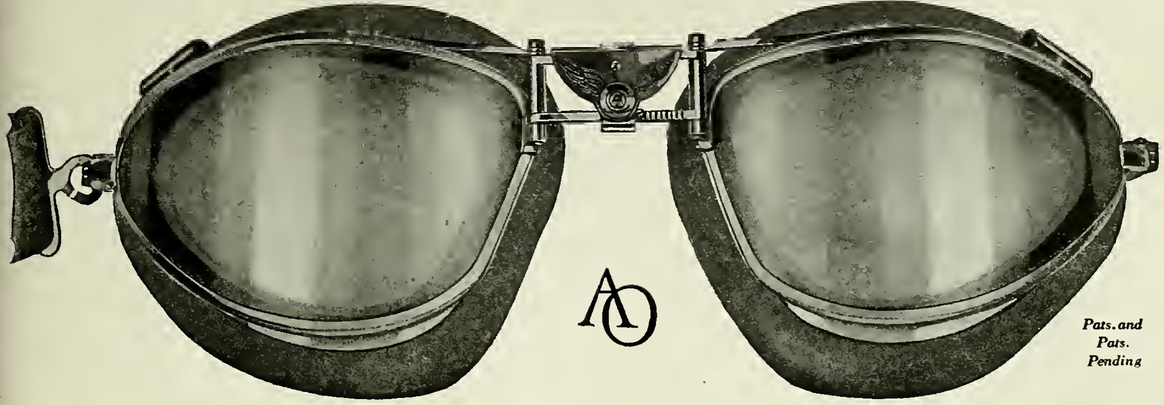
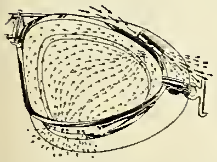


No fogged lenses; no air leaks no "goggle headache"



No Fogging

Note suction tube at top and staggered intake holes at bottom. Tube will catch slip stream no matter what the angle of the ship or flyer's head, and creates suction to provide constant ventilation behind the lens, as shown in the diagram. Thus the lens will not fog.

No Headache

A cylindrical lens, decentered so the optical center is moved to a position in direct line with the straight-ahead line of vision, patented by American Optical Company. Supplied in white glass or Calobar glass which is glare-proof, but does not alter color values. No goggle headaches. Permanent eye comfort.

Better ventilation behind the lens: The slip stream passes through special tubes at the top of each eye-cup, forcing a draft which pulls air in at the bottom and out at the top. Ventilating perforations are staggered; there are no direct air needles, no air leaks. The lenses will not fog.

Precision lenses, white or glare-proof: In the lenses, by a new and patented principle of aviation goggle lens design, all prismatic and astigmatic effects (the causes of goggle headache) are removed. There is no eye-fatigue. Your choice of white or glare-proof CALOBAR lenses.

Completely adjustable without tools: The distance between eye-cups can be adjusted to fit any face. Cushions, lenses, binders, headband—every part of the goggle can be easily adjusted, removed or replaced with the fingers.

Removable, separate cushions: There are two durable, finely proportioned rubber cushions, separate, each with a binder which can be quickly and easily removed from the frame *and replaced.* A notable achievement for your comfort.

Note: Government orders for American Transport Goggles will soon be completed. These fine goggles will then be generally available. Correspondence, inquires and advance orders are earnestly solicited.

Price: with clear white lenses	$20.00
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American Optical Company
Southbridge, Massachusetts

AMERICAN TRANSPORT

AVIATION GOGGLE

AN AMERICAN OPTICAL COMPANY PRODUCT

(*Continued from preceding page*)

Gravel runways which are well consolidated may be treated as described above. If the gravel is loose, however, a different method called the "mulch method" must be used. In treating gravel by this method the loose gravel is sprayed with about one-third of a gallon of cold refined tar per square yard. This loose material is then moved into windrows with a blade grader and one-third gallon per square yard of cold refined tar applied to the solid surface thus exposed. The material in the windrows is then spread out and mixed with the blade grader. The result is a tar and gravel mix tied down to the solid material with a tar prime coat. The finished surface should be sealed with about one-sixth gallon per square yard of cold, refined tar, a light sand cover, and rolled. The maintenance on this type of runway surface will be about same as for the straight surface treatment type.

At most airports it will be necessary eventually to provide paved runways of some sort with an artificial foundation. For the present, at least, we think a six-inch waterbound macadam or slag foundation will give sufficient strength for runways, provided the sub-grade is adequately drained. Where the sub-grade is heavy clay, there should be an insulating layer of two or three inches of stone screenings, sand, fine gravel, or similar material spread on the top of the sub-grade before the aggregate for the foundation is placed. This will prevent the clay from working up into the foundation.

A very satisfactory runway surface over a foundation of this sort is a Tarvia Re-Tread top, which is composed of a mixed-in-place combination of Tarvia and crushed stone or slag. The finished top is about two inches thick.

To build a Re-Tread top of this sort we first spread loose crushed stone ranging in size from three quarters of an inch to one and one-half to a depth of about two and one-half inches over the prepared foundation. A special grade of Tarvia is sprayed on this stone at the rate of one-half gallon per square yard. This tar is immediately mixed with the aggregate by means of a blade grader or similar equipment.

As soon as the aggregate is completely coated, another application of four-tenths gallon per square yard is made and the mixing resumed. When the tar and stone are thoroughly mixed, the mixture is spread out and permitted to set. This setting up may require from a few days to a week depending on the weather. The runway may be used during this period if the disturbed portions are smoothed out with the grader or drag.

When the mixture has become tacky or sticky it is rolled with a ten-ton roller until thoroughly consolidated. The surface is then covered with about fifteen pounds of stone chips or pea gravel per square yard which should be broomed into the surface voids and rolled in place. A third application of about one-third gallon per square yard of Tarvia Re-Tread with a light sand cover rolled in place will complete the job. If slag is used the amount of Tarvia in the body of the Re-Tread top should be increased by about 25 per cent.

TRUSCON HANGAR DOORS

A SPECIAL door for airplane hangars in which limited space is available for operation of the door units in opening and closing, has been developed and is being manufactured by the Truscon Steel Company of Youngstown, Ohio. This door is applicable to any kind of hangar construction, and is not limited to Truscon standard steel hangars. It may be used on any size of door opening.

The frame of the door is of heavy gauge tubular copper alloy steel, mitred and reinforced at the corners and electrically welded at all joints, or, if preferred, structural steel shapes may be substituted for tubes in the frame. The lower sections are solid steel panels made from cold-rolled copper alloy sheets, full pickeled, re-annealed and patent leveled. Any desired area may be built of standard steel window sections to permit adequate daylighting of the hangar. The door design is in harmony with recognized architectural practice, thus giving to the building a unified and effective exterior.

Truscon hangar doors are not suspended from overhead tracks, but are equipped with Timken roller bearing trucks operating on tracks embedded in the concrete floor. Alemite lubrication maintains these trucks in easy operation. Even the huge 20-foot leaves, each 35 feet high and weighing seven tons, of the airplane assembly building at Wright Field are easily and quickly opened or closed by one man. This is made possible by a special operating device incorporated in each door.

A light guide rail at the top insures accurate alignment without adding to the weight supported by the wide-spanning overhead structure.

These doors are made to operate in either of two manners. Many of the most modern hangars, including the one at Bettis Field, McKeesport, Pa., the Canadian Colonial Airways hangar at Albany, N. Y., and the Newark, N. J., airport hangar, use straight slide doors which, when opened, disappear into towers or other auxiliary portions of the hangar structure.

This arrangement is popular because it leaves the entire hangar opening unobstructed, admitting a 100-foot ship to a 100-foot hangar. The architectural effects provided in most new type hangar construction provide convenient storage space for the doors of this style when opened.

Round-the-corner doors, which fit snugly

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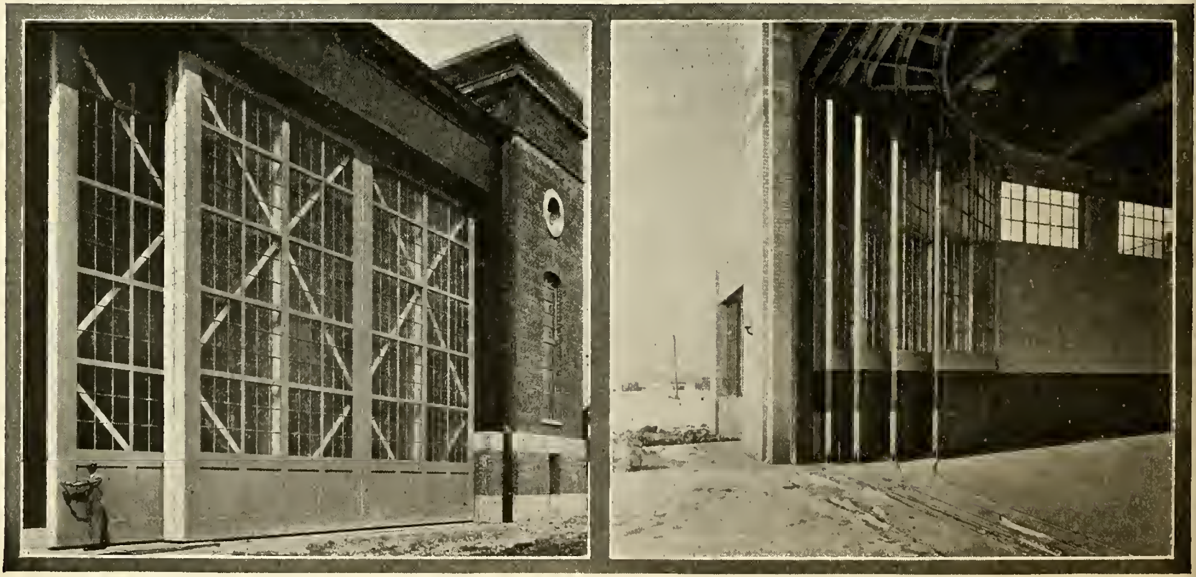
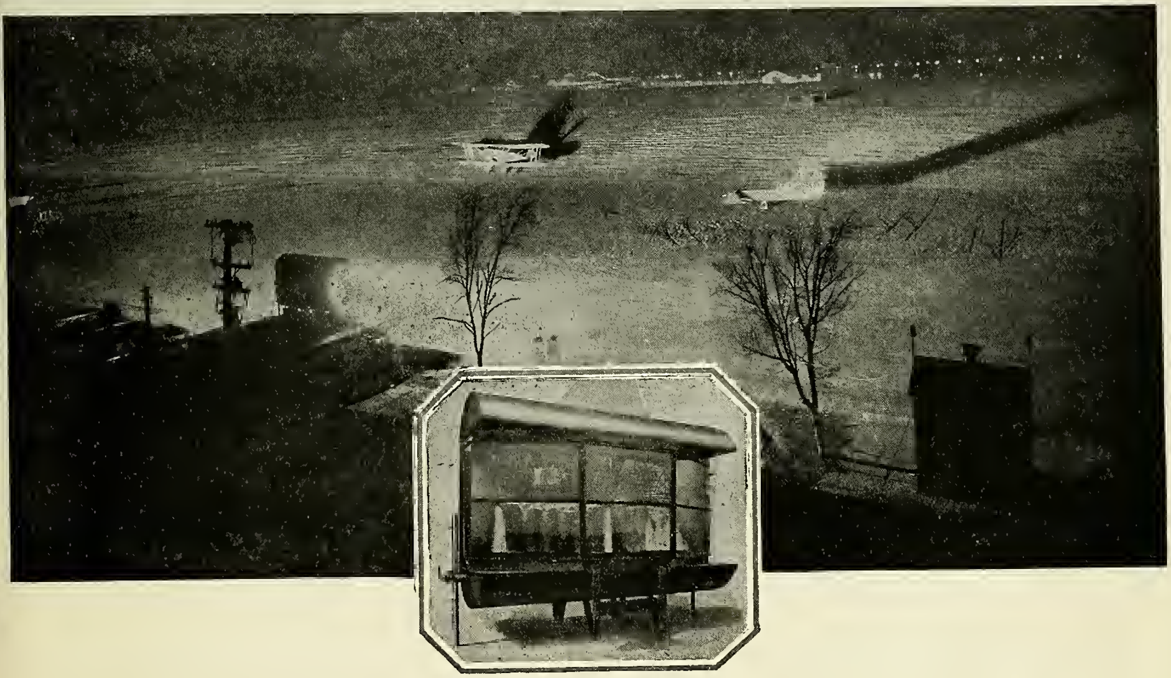


Hangar doors at Army assembly building, Wright Field, and (right) "around the corner" type of hangar doors.



LIGHT WILL PUT YOUR AIRPORT ON THE NIGHT MAP OF AMERICA

No other single unit provides so much light with so little glare

THE new G-E airport floodlight (Type ALH) distributes the light from eight 3000-watt lamps evenly throughout an angle of 180 degrees. Although the amount of light is more than that provided by any other single unit, glare is minimized by confining the light-beam to a low height above ground. This unit is exceptionally reliable. Should several of the lamps burn out, the light on the field is sufficient to afford visibility for night landings. The unit is totally enclosed and self-cooled. There is no ventilator, fan, or motor. Address the nearest G-E sales office for complete information.

For ten years, General Electric has manufactured equipment specially designed for airport and airway lighting. In fact, a majority of the equipment in use to-day bears the G-E monogram. Look for this emblem also on MAZDA lamps, transformers, control equipment, and cable.

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GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y., SALES OFFICES IN PRINCIPAL CITIES

(Continued from preceding page)

against the sides of the hangar near the opening, are used in the Air Corps assembly building at Wright Field, Dayton, Ohio, on the N. A. T. hangar at Chicago, and on many other up-to-date structures. They are preferred where there is no objection to narrowing slightly the door opening by storing opened doors at the sides.

Because of their simple construction, there is said to be little upkeep expense to these doors. Barring accident, they will give constant service as long as the building lasts.

In addition to these specialized hangar doors, the Truscon Steel Company also manufactures steel roof decks of light weight, which, insulated and waterproofed, are widely used on all kinds of hangars. A recent installation of this type of roof is on the new United States Navy hangars at Coco Solo, Canal Zone.

Complete steel hangars of standardized parts are fabricated by the same company. Steel roofs, steel windows, doors, concrete reinforcing and other standard building parts have been tested by the Truscon Steel Company through widely varied and long-term use under all kinds of conditions. These have been adapted to the requirements of aviation.

WESTERN AIR EXPRESS TERMINAL

ON the West Coast, Western Air Express is building one of the finest privately owned and operated airports in the world. This company has pioneered in aviation projects in the past; now it is pioneering in the building of a model airport to be used exclusively by Western Air Express planes.

The site was purchased from the city of Pasadena. It is located 20 minutes by automobile travel from the Los Angeles City Hall, or it can be reached by street car within 30 minutes. One side is bordered by one of the main Southern California boulevards.

The site includes 188 acres of level land and there are no nearby obstructions. The territory is so zoned that there exists no prospect of undesirable obstructions arising in the future. The terminal will represent an investment of considerably more than $1,000,000. When completed, the airport will meet the most rigid requirements of the Department of Commerce. Beyond that, it will have passenger accommodations of unusual luxury, and for the operations department it will have facilities most complete and, in one instance, quite novel.

To the airport builder the most interesting feature of the new Western Air Express terminal will be the service hangar and of second interest will be the passenger depot, both of which have unusual features.

The service hangar is hexagon in shape and somewhat like a railroad roundhouse. The hangar has a diameter of 286 feet and has six doors, each door 126 feet in width. It is so designed that six planes, each with a wing spread of 120 feet, may be serviced at one time.

All six doors are controlled by electricity and all may be opened within thirty seconds. This is a safeguard against the danger of fire. The interior floor has a slope toward the door openings, permitting one man to lift the tail of the plane and roll it out in case of emergency. It has been estimated that six planes can be removed from the hangar within one minute.

The hangar is built of steel, concrete and galvanized iron, with a maximum amount of glass to give proper lighting. All the interior is covered with aluminum paint to enhance the lighting.

In the exact center of the hangar are located stock rooms, and lockers for the mechanics. Above these there is a glass enclosed office for the master mechanic. From this office the head mechanic may watch all work being done. He may step from his office onto a circular platform and converse with any mechanic without going down on the floor. Experts estimate that the arrangement will effect a 20 per cent saving in the servicing of airplanes. The hangar was designed by W. Y. Eaves, of the Eaves Construction Company, and C. C. Cole, superintendent of operations for Western Air Express.

There will be two additional hangars for passenger ships, each 420 feet long and 85 feet deep. In addition there will be a special hangar for airplanes used exclusively in air mail service. There will also be complete machine shops and a warehouse.

The passenger depot is to be of modernistic architectural design with a glass-enclosed office for the chief dispatcher four stories above the ground. On the ground floor there is to be a restaurant with a seating capacity for 150 persons. There is also to be a large waiting room, a lounge room for women, ticket office, telegraph office, etc. The second floor is to be devoted to administration offices, weather bureau, meteorological office, radio station, etc. The second floor roof on either wing will constitute an observation pavillion for spectators.

The entire field is to be under the observation and control of a chief dispatcher operating from the glass-enclosed tower. By light and buzzer signals he will control every airplane at the field and by radio he will know the location of every ship in the air.

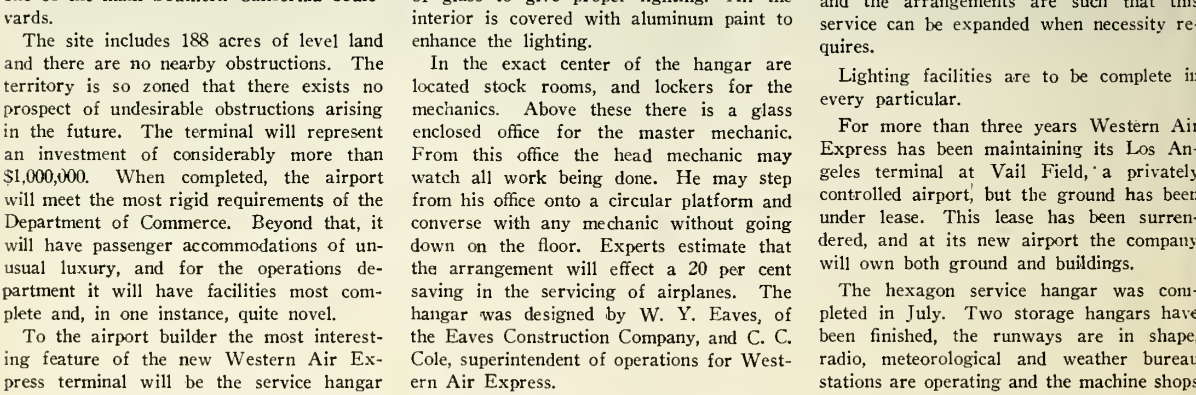
The field will be traversed by three runways surfaced for most all weather conditions. The principal runway, extending along the direction of the prevailing winds, will be 3,400 feet long and 500 feet wide. Another runway will extend from southeast to northwest and will be 500 feet wide and 2,700 feet long. The third runway, running east and west, is to be 300 feet wide and 2,600 feet long.

The concourse leading from the passenger station to the field will permit of the loading of three airplanes at the same time, and the arrangements are such that this service can be expanded when necessity requires.

Lighting facilities are to be complete in every particular.

For more than three years Western Air Express has been maintaining its Los Angeles terminal at Vail Field, a privately controlled airport, but the ground has been under lease. This lease has been surrendered, and at its new airport the company will own both ground and buildings.

The hexagon service hangar was completed in July. Two storage hangars have been finished, the runways are in shape, radio, meteorological and weather bureau stations are operating and the machine shops ready. The major remaining job is the construction of the passenger depot and the work of surrounding it with appropriate parkways and gardens, but it was predicted all this could be completed so that the airport might be formally dedicated early in September.



Interior of the new hexagon hangar at Western Air Express Terminal. The master mechanic's office is in the center.

Snow Removal *in Midsummer?*

NO, THAT'S a next winter's chore—but the "Caterpillar" Tractor that is bought today to build the airport will clear lanes when winter storms come. It will furnish the power to level the new field, to drain it, to roll it. It will stay on the job to handle heavy planes, to plow snow, to keep dust down.

Wide tracks that grip the ground yet tread lightly on the smooth surface so important to the efficient flying field; a staunch construction based on the long life of heat-treated steels, extra power—these are outstanding features of the "Caterpillar" track-type tractor.

Prices—f. o. b. Peoria, Illinois

TEN	$1125	TWENTY	$1975
FIFTEEN	$1500	THIRTY	$2475
SIXTY	$4300		

Caterpillar Tractor Co.

EXECUTIVE OFFICES: SAN LEANDRO, CALIFORNIA

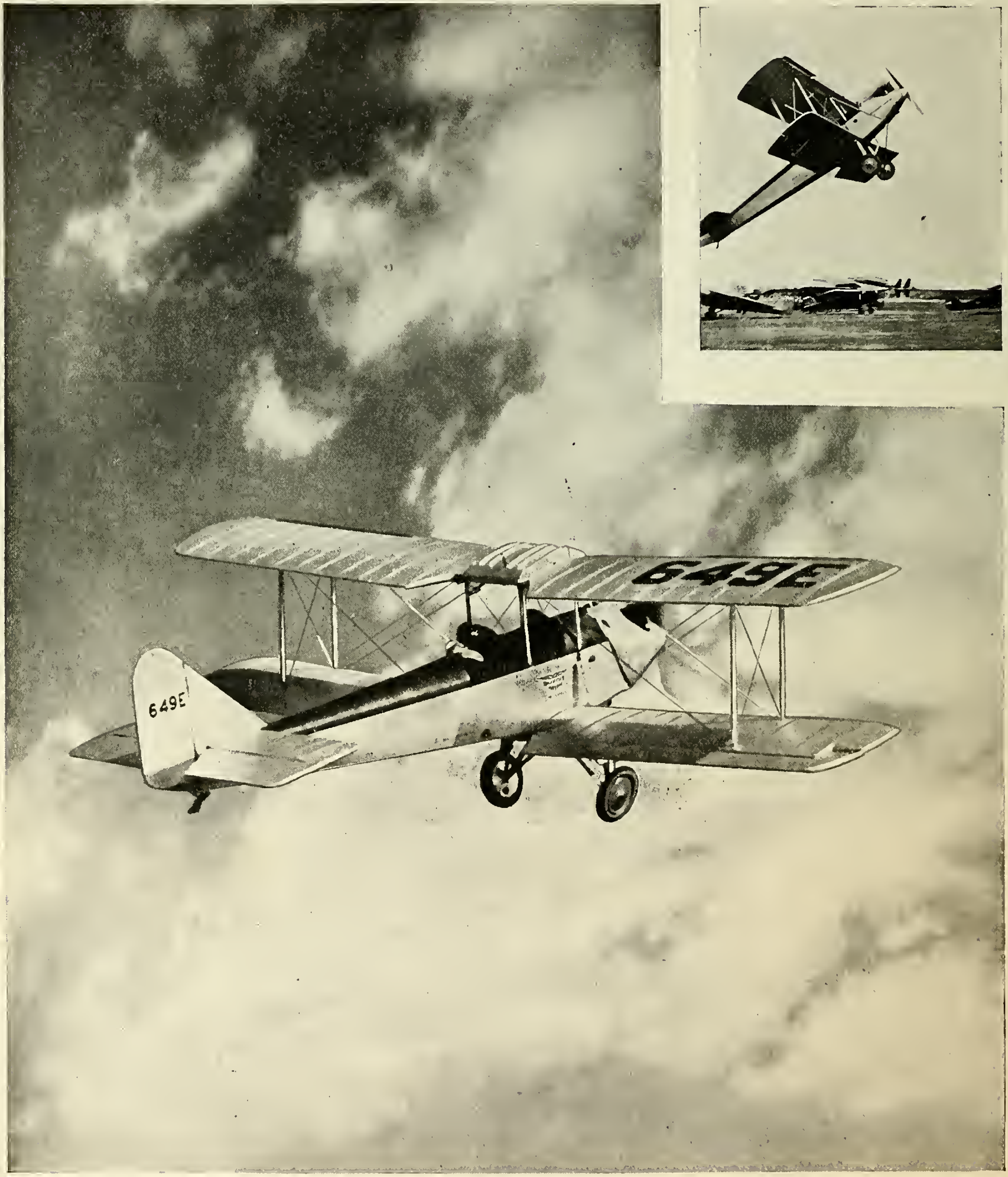
Sales Offices: Peoria, Illinois 50 Church St., New York San Leandro, Calif.

Holt Combined Harvesters ✓ Russell Road Machinery

"Caterpillar" Tractors

CATERPILLAR
REG. U. S. PAT. OFF.
TRACTOR

Right off



THE OUTSTANDING SPORT AND

the old front porch

. . . it's the light plane for training and sport

IF there's any light plane that measures up to the requirements of the flying instructor and the flying sportsman, it's this ship that has left in its wake a string of records and years of air miles as a training, club, and touring plane.

In its uncanny ability to put the horizon between its wheels and the ground in a very short distance, the Avian gives the experienced pilot something to think about. But unusually quick take-off is only the prelude. Put the Avian through its paces. Fly through all sorts of weather. Try to throw her into a spin. See what happens to a side-slip. Float in to a landing . . . You've never flown a ship more successful in keeping a level course. Spins are not in the bag. For the genius of designing has given this famous light plane the capacity for a remarkable flying performance and a generous safety factor of 8. Added to the inherent safety and stability of the Avian, Handley-Page wing slots are standard equipment. They help to prevent spins and slips, lower stalling speed and decrease landing speed.

Famous in Europe

As a training plane, as the plane flown by record-making pilots the Avian is famous in the flying circles of Europe. It is popular as a club plane. Sportsmen use it for touring because it is economical, easy to handle, sturdy and not temperamental.

Yet dependability has not dimmed performance. The Avian has the speed, the airworthiness necessary to achieve records. Witness: Fastest time England to Australia . . . first solo flight between these two countries . . . fastest time England to India . . . first non-stop flight London to Rome.

Now It Rides America's Sky-Lanes

Under sole royalty rights the Avian is now being produced in this country as the Whittelsey Avian. It's the same ship with a different name.

It offers the flying instructor the opportunity to turn out skilled flyers in fewer hours, with less expense and without the hazards that usually attend the task of teaching a fledgling to fly. Its upkeep is low-keep. Easy to maintain. Economical in the air and on the ground.

And the man who wants to fly his own ship, either for business or pleasure, will find in the Whittelsey Avian everything that he can desire. Speed and durability. Safety that no other light plane can approach. Sturdiness. Quickness in take-off as well as ease in landing.

Here Are Its Specifications

Power Plant: Cirrus Mark III, 95 H.P. air-cooled, four-cylinder in-line aircraft engine. Famous for economy of operation and maintenance. Top overhaul at 200 flying hours. *Economy of Operation:* 20 miles to gal. of gas . . . 500 miles to gal. of oil . . . *Speed:* Maximum, 102 m.p.h.; cruising, 85 m.p.h. . . . landing, 35 m.p.h. . . . *Ceiling:* 18,000 feet . . . *Cruising Range:* 5 hours or 430 miles . . . *Weight:* Light, 875 lbs. . . . *Aerobatics:* 1450 lbs. . . . Top, 1600 lbs. . . . *Dimensions:* Wings span, 28 ft.; Width folded, 9½ ft. . . . Height Overall: 8½ ft., length overall, 24 ft. . . . *Price:* Only $4995, Flyaway or F. O. B., Bridgeport, Conn.

It Sells on Performance

It is doubtful if there is any light plane better adapted to every day flying needs. Certainly there is no light plane more economical and safer to fly, easier to maintain. And the Whittelsey Avian performs every evolution, meets and conquers every obstacle with the ease of a born aristocrat.

There's Money To Be Made

National distribution of the Whittelsey Avian is being completed. Representation in some of the leading aviation centers of the country is being arranged. Interested and responsible parties are invited to write for further information concerning our sales plan.

Whether interested in the Whittelsey Avian as a flying school head or as a sportsman, write us and we will gladly send you complete and detailed information concerning this famous light plane. Dept. E-4, Whittelsey Mfg. Company, General Office and Plant, Bridgeport, Conn.

AVRO
AVIAN
In England

TRADE MARK
WHITTELSEY
AVIAN
In America

TRAINING PLANE OF THE WORLD

TECHNICAL

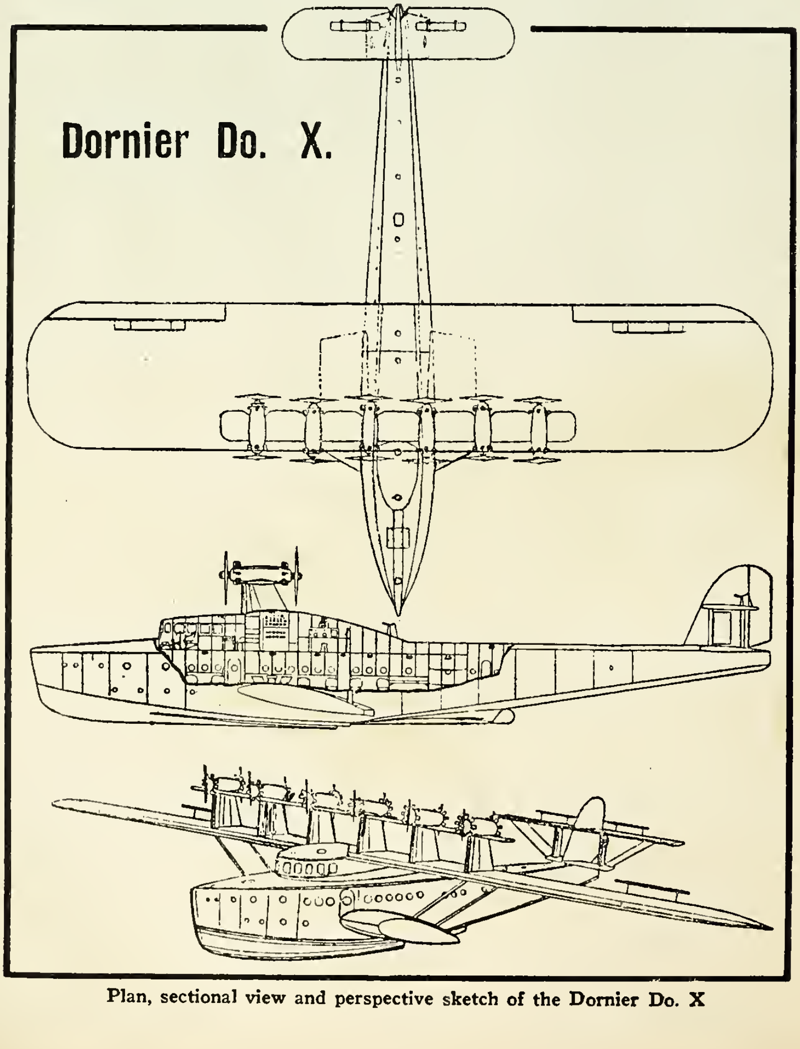
THE 100 PASSENGER DORNIER DO. X

By W. R. Hanawalt

THE 100-passenger Dornier flying ship Do. X. completed recently at the Dornier factory at Rorschtch on the Swiss side of Lake Constance, Switzerland, was successfully tested on July 12. The craft, which is powered by 12 Jupiter engines of 500 horsepower each, has a total weight of 55½ tons when fully loaded with a disposable load of 28 tons. It was built in accordance with the theory of Dr. Claude Dornier, the designer, that airplanes can be made more efficient with increased size. The Do. X. is a radical improvement in efficiency, carrying one pound of useful load for every pound of its own weight. It has a high speed of 150 miles per hour and a cruising speed of 115. Three of the ships have been ordered by the Deutsche Luft Hansa for transatlantic passenger service.

In design the Do. X. is a semi-cantilever high-wing monoplane. Its wing span is 157 feet, its length 131 feet and the top of the propeller is 31 feet above the keel of the hull. Stump wings project from the hull, bracing the wings with three oblique struts of high-tensile steel on each side, and giving lateral stability when maneuvering on the water.

Many possibilities of light wing construction were exploited in the construction of this plane, according to the designer. The most notable feature is that the wing covering is not permanently attached to the spars and ribs, but consists of stiff self-contained metal plates which are attached to the wing frames in such a way that they can be easily detached. The lifting area totals 5,034 square feet, of which the ailerons include 2 square feet.



Plan, sectional view and perspective sketch of the Dornier Do. X

The hull of the Dornier flying boat, whic has a total volume, with wing stumps, 14,000 cubic feet, is divided into three deck In the lowest deck is space for fuel, freigh baggage, tools, provisions accessories and s equipment. The middle or main deck, whic is sixty-four feet long, is exclusively r served for passengers' parlors, entertai ment rooms and sleeping compartment For long-distance flights the stern of th passenger deck can be separated by a scree and utilized to accommodate the crew. Th third or upper deck contains the pilots' an navigation rooms. The front part of th upper deck, which offers the best observation, is reserved for the pilots. Immediatel behind this is the cabin for the navigatin officers, which is occupied by the commande of the flying ship. In an adjoining roon which contains necessary tables, switchboards for the twelve engines and accessories, the chief engineer and four assistan mechanics will be stationed. Another adjoining room will be occupied by the radi operator, and to the rear of this is installed room for minor machinery driven by a small independent motor.

Twelve Siemens-Halske built Jupiter engines producing 6,000 horsepower ar mounted above the plane in tandem pair one driving a tractor, the other a pushe propeller. The two engines in each gondol are thus combined into a double engin which is supported over the plane by a vertical brace. Horizontal braces join an strengthen the six gondolas laterally. Th power plant of the Do. X. has a great reserve, and can be throttled 40 per cent immediately after the take-off. At the recen tests at Lake Constance the ship took of in 28 seconds using eight of the twelve engines. All motor control units can be inspected and repaired while in flight. Th fuel reserves are away from the engines i the deepest part of the ship's hull, and the are kept separated by fireproof compartments. A total fuel load of 4,230 gallon can be carried. A connection between th benzene flowing out of these tanks and th engines is wholly impossible and the entir fuel reserve can be protected against explosions by neutral gas. The conduits leading from the fuel supply can be constantl observed and any foreign substance removed during flight.

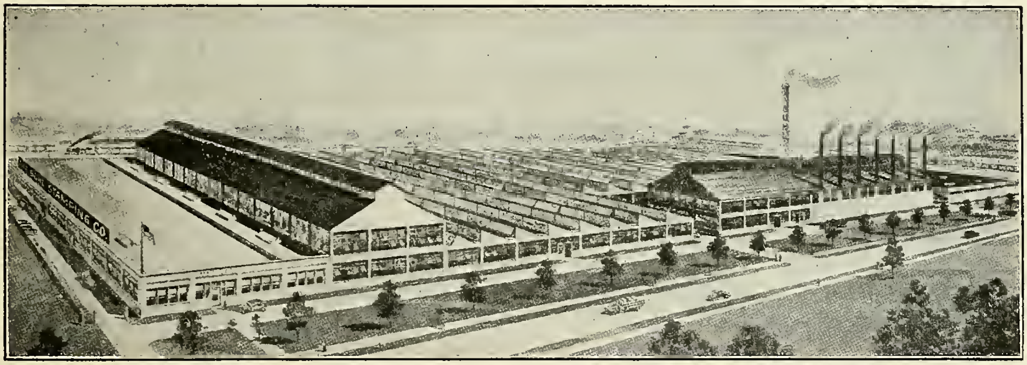
All tail surfaces are metal covered. Th horizontal stabilizer, with 477 square fee of area, is joined to the end of the hull b two upright supports on each side of th vertical fin and is braced obliquely. The fi divides the stabilizer, and the elevators ar cut away to allow free action of the rudder

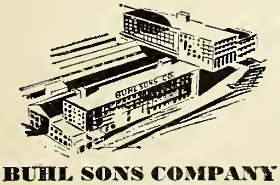
(*Continued on next page*)

BUHL BUILDING
DETROIT

THE airplane industry keeps right on growing in such a startling manner that more than ample facilities, more than adequate resources are essential to any supplier who hopes to meet the mounting demands of the manufacturer. That is why the new aircraft division of the Buhl Stamping Company has received such an enthusiastic reception throughout the industry. Here there can be no question of honest, intelligent manufacture, prompt deliveries on schedule, and efficient service on any and all occasions—for the Buhl Stamping Company brings to aviation a record of forty years as producers of fine metal stampings for many industries. It is truly a source of supply as dependable as the products which gained it world-wide recognition.

BUHL AIRCRAFT CO.
MARYSVILLE


STAMPING CO.


BUHL SONS CO.

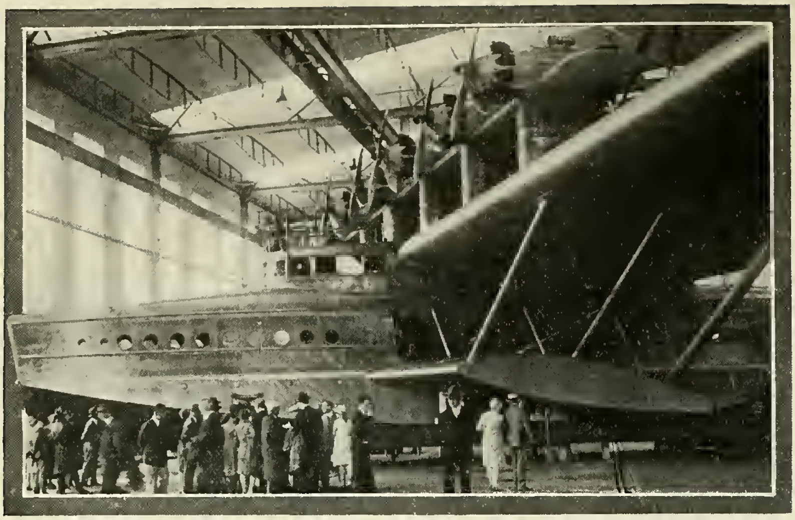
BUHL SONS COMPANY
DETROIT

BUHL

STAMPING COMPANY

DETROIT, MICHIGAN

The Buhl name has been identified with progressive industry since 1833. Buhl products today carry far more than the name alone—they preserve the priceless heritage of almost a century of manufacturing leadership and integrity.



The new 100-passenger Dornier Do.X. flying boat with 12 engines

(Continued from preceding page)

Both ailerons and elevators are balanced by smaller auxiliary airfoils mounted above and forward of the axis of rotation.

Piloting the ship is an easy matter mechanically. The starting of the engines, regulation of revolutions, and oil pressure and temperature are controlled by an engineer assisted by four mechanics in the engineer's room. The pilot controls all the engines by a single throttle with which he can vary the gas to the individual engines, and shut out engines as he desires. By the use of special indicators the pilot can see which engines are running and what maximum power he has. Two steering gears operate the flying controls. The commander, with the first officer, directs the course and gives the orders to the crew. By this arrangement the pilot is not forced to act simultaneously as pilot, navigator, and engineer; each member of the crew is able to concentrate his attention to a special task.

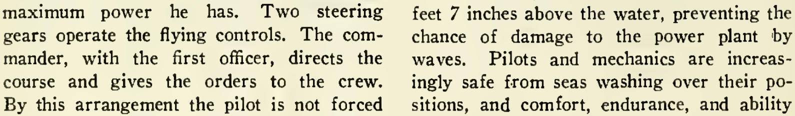
The Do. X. is designed to carry 100 passengers and a crew of twelve, allowing 260 pounds per passenger. It has a disposable load of 56,843 pounds, and a cruising range of 2,600 miles. A pay load of 22,000 pounds can be carried on a non-stop flight of 1,550 miles. The maximum speed of the flying ship is 150 miles per hour with 12 engines, and the cruising speed is 115 miles per hour.

Besides the greater efficiency in carrying capacity displayed by his radically advanced craft, Dr. Dornier claims for it a more important development in its increased factor of safety. The use of a large crew, with individual work assigned to each under supervision, reduces the possibility of accidents resulting from faults of personnel or from unnoticed causes. Accidents from engine failure are minimized, since the ship can fly and maneuver on eight engines; tools, space, and personnel being carried for repairs. The greatest element, however, in the safety design of the Do. X. is its seaworthiness. Because of its large size and yacht-like design, it is capable of weathering a gale on the sea of from force 4 to 6, and it can take off in a storm of any force below 4. The propeller sweep is 21 feet above the water-line, and the carburetors are 25 feet 7 inches above the water, preventing the chance of damage to the power plant by waves. Pilots and mechanics are increasingly safe from seas washing over their positions, and comfort, endurance, and ability to carry out repairs in rough weather are enhanced at the same time.

In the recent tests at Lake Constance, Chief Pilot Wagner cruised the ship on the water for two hours to check the controls and instruments. Later he made several test flights, carrying 25 passengers. On one of these he took off with 8 engines in 28 seconds. The pilot reached 2,000 feet in one flight, when, with Dr. Dornier aboard, he flew for three hours.

Specifications

Number of engines	12
Power of each engine	500 horsepower
Total power	6,000 horsepower
Length	131 feet
Span	157 feet
Height	31 feet
Propeller clearance above water	21 feet
Volume of hull with wing stumps	14,000 cubic fe
Total wing area	5,034 square fe
Aileron area	285 square fe
Fin area	116 square fe
Rudder area	89 square fe
Stabilizer area	477 square fe
Elevator area	136 square fe
Permissible loading per square foot	22.6 poun
Total structural weight	37,800 poun
Total power plant weight	15,715 poun
Total weight of accessories	1,350 poun
Total weight	54,872 poun
Total weight with crew	56,456 poun
Permissible weight loaded	113,300 poun
Disposable load	56,843 poun
Fuel capacity (including gravity tanks)	4,230 gallo
High speed	150 miles per ho
Cruising speed	115 miles per ho
Cruising range	2,600 mil



The Dornier Do.X. afloat on Lake Constance during tests

THICKNESS GAGE

A THICKNESS gage or feeler stock : being produced by the L. S. Starre Company of Athol, Mass., in a new and cor venient form. Number 666 Starrett thick ness gage stock comes in 25-foot rolls, ½ inch wide, and in thickness from .0015 t .015 of an inch, packed in dirt protectin metal cases.

This gage stock is spring tempered t insure accuracy and dependability an marked every six inches with a line and th thickness, which allows accurate cutting an eliminates waste. It has the decided advar tage that if the stock becomes bent c kinked from use, the damaged part is quickl cut off and the work continued. It is e pecially useful for checking gear play, spar plugs, valve clearances, fitting pistons or an place where certain thicknesses are in cor stant use.

BLACK AND DECKER ENGINE VALVE TOOL

THE Black & Decker Self-Centering Air craft Pilot is designed to perform auto matically accurate valve reseating. This too consists of a pilot stem, which is centered i the guide by means of two cones snugl fitting the pilot and serving as a bearin for it. These cones are held in place in th guide by means of springs. The turnin handle is quickly attached to the pilot ste by means of a ball chuck, and a positiv even feed is given the reamer by the fee screw.

With this pilot are used Black & Decke high speed, tungsten steel reamers, whic are efficient and smooth cutting on th tough bronze seats of aircraft engines. Onl three sizes of pilots are required to f all aircraft engines, each pilot having range of ⅛-inch.

VENTILATED INNER PISTON RINGS

VENTILATED inner rings designe primarily for use with vented oil ring to reduce oil consumption, to permit th return of excess oil to the crankcase an to prevent piston slap, have been announce by the American Hammered Piston Rin Company of Baltimore, Maryland.

AT THE FIRST AERO SHOW HELD IN AMERICA

ORVILLE WRIGHT AND GLENN CURTISS BOUGHT U. S. AIRPLANE TIRES

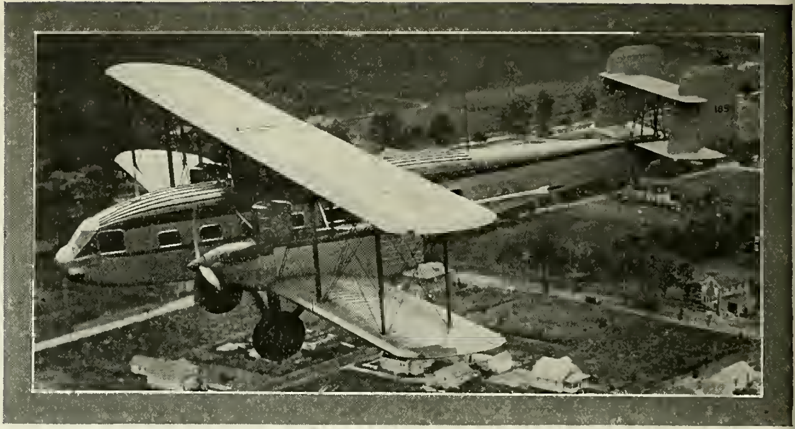
At the first Aero Show ever held in America, the U. S. Rubber Co. exhibited pneumatic tires designed expressly for aircraft. Orville Wright and Glenn Curtiss were the first customers. This pioneer achievement was made at a time when most accessory manufacturers gave little or no thought to the problems of the aviation industry. And since that time—for a period of more than 20 years—the United States Rubber Company has constantly co-operated with government agencies and with independent manufacturers to develop the finest and most dependable tire that can be built for airplane service. Today this company offers a complete line of tires in all sizes, with either plain or non-skid treads, every one of which is built of Web Cord construction—assuring maximum strength without excessive weight. U. S. branches everywhere are prepared to give immediate service.

UNITED STATES RUBBER COMPANY

United States Airplane Tires are used on this fast biplane built by the New Standard Aircraft Corporation, Patterson, New Jersey.

UNITED STATES
AIRPLANE
TIRES

CURTISS CONDOR 18-PASSENGER TRANSPORT



The Curtiss Condor Transport in flight near Roosevelt Field

THE new 18-passenger Curtiss Condor transport was flown at Garden City, N. Y., on July 21st by the engineering staff of the Curtiss Aeroplane and Motor Company for its first public demonstration and inspection. The Condor will be put into immediate production.

The first point of difference between the Condor and the other large passenger airplanes familiar to the American flying public is that this plane is powered with two rather than with three engines.

The wind tunnel test indicated that the Condor would fly, fully loaded, and maneuver on one engine. The results of the wind tunnel tests were paralleled almost exactly in actual flight. Even the speed, estimated at more than 130 miles an hour, was found to have been predicted accurately when the engineers first flew the Condor. The Condor is powered with two Curtiss Conqueror water-cooled engines of 635 horsepower each.

One feature of comfort for passengers is found in the large, comfortable armchairs. Although they are light enough to be lifted with one hand, they are particularly roomy. They have high backs tapering to padded headrests. They are covered with top-grain leather which is both attractive and durable.

These chairs are adjustable automatically to any desired angle of inclination. Although this adjustment is accomplished easily by leaning back to a satisfactory position, the chairs retain the desired angle until the passenger wishes to change it.

In arranging the ventilating system, draughts or excessive cold were eliminated insofar as possible. Three factors contribute to this ventilation. These are: sufficient cubic area, ventilators for admitting fresh air without draughts, and steam heating to control the temperature, the last feature never before employed in an airplane.

In the Condor, the cubic area of the passenger cabin is 865 cubic feet. The floor area is 138 square feet. The height of the ceiling from the floor is six feet three inches, enough to allow a tall person to stand upright. The interior is arranged to accommodate three passengers abreast, with a rather narrow aisle on the left side for passing fore and aft.

The ventilators admit air through the roof of the plane and can be regulated. They force the air along the ceiling of the interior in such a way as to make draughts improbable. One ventilator is located in the pilot's compartment, one in the main cabin and one in the lavatory.

The diminutive radiators, heated by super-steam, are located beneath openings in the floor. Weighing less than one pound, the water for this system is heated to a high temperature in small boilers disposed on the exhaust manifolds of the engines in the outboard nacelles.

The engine nacelles are built up from the lower wing, above the landing gear, thus reducing the amount of engine vibration imparted to the fuselage. Three-bladed propellers further reduce vibration. On a geared engine, such as used in the Curtiss Condor, there is very little loss of efficiency.

The interior of the cabin is divided into three compartments, separated from each other by arches. Each compartment accommodates six passengers, and may be completely shut off from the other two by means of doors, providing privacy for parties desiring a section of their own. The compartments have attractive carpets, and the interiors are finished in light weight panelling upon which the grain of natural wood has been reproduced. Over each seat is a net rack on which light articles may be placed.

There is a window beside each set of seats, permitting fair vision for all of the passengers. By reducing the glass area, the sound-proof and temperature qualities of the passenger cabin are improved. Special non-shatterable glass is used throughout.

Sound-proofing and vibration dampening of the passenger cabin are made possible by the introduction of an air space of approximately three inches between the inner and outer walls of the cabin, and this air space is double lined with a sound and shock absorbing material.

Provision is made for the installation in the main cabin of a private compartment with four sleeping berths, each 28 inches wide. For night flying on air routes in the future, the Curtiss Condor can be converted entirely into a sleeping plane with twelve full size berths. Space also can be arranged for the installation of a desk set, buffet

(*Continued on next page*)

The slow landing speed of the Curtiss Condor Transport is illustrated in this view

Fokker flies . . . the Santa Fe Trail!

WESTWARD over the Santa Fe Trail the tides of empire have swept, throughout the centuries. Men and women of many minds, and of as many purposes!

Prehistoric cliff dwellers — Pueblos, Navajos and warlike Apaches — Coronado's conquistadores, searching for Fabled Cities — the exploring Padres, Garces and Escalante — Kit Carson, Jedediah Smith, frontiersmen, trail blazers — the 'Fortyniners, eager for California's gold — pioneer families, in covered wagons — then the railroad, and the Great Boom — scores of thousands of travelers, pleasure seekers, home builders!

Over the Santa Fe Trail have trekked millions who came to live or to play in Southern California. Once they journeyed months to reach the Pacific, then for weeks, finally but days. Now it is a matter of hours, for—

Fokker Flies the Santa Fe Trail.

Western Air Express liners leave Kansas City and Los Angeles each morning, soaring serenely above the plains, the deserts, the rivers, and the mountains that so tried the early travelers, and complete the 1417 mile journey in twelve day-light hours!

To assure the speed, comfort and dependability, necessary for this amazing travel luxury, Western Air Express chose Fokker super tri-motor air liners. Other commercial lines using Fokkers are Universal Aviation Corporation; Texas Air Transport; Standard Air Lines; National Parks Airways; Pan-American Airways; Western Canada Airways; Dominion Airways.

Write your name and address and vacation destination in the margin below, send it to the Fokker Travel Bureau, 655 Chamber of Commerce Bldg., Los Angeles, Calif., with a five-cent stamp (to pay air-mail postage) and let us send you our illustrated booklet, "When Air Travel Pays."

FOKKER AIRCRAFT CORPORATION OF AMERICA

Factories: WHEELING, WEST VIRGINIA, *and* TETERBORO AIRPORT, HASBROUCK HEIGHTS, NEW JERSEY
Address business inquiries to NEW YORK OFFICE, 110 EAST 42nd STREET

Name..AD

The T. A. T.'s newest transport, the Curtiss Condor, in flight during recent tests

(Continued from preceding page)

and a refrigeration system.

All baggage is carried in two metal-lined compartments, one in each outboard engine nacelle aft of the gas tank. This leaves all available cabin space at the disposal of the passengers, and also makes it impossible for baggage to be spilled into the passenger compartments, as sometimes happens when baggage is carried in the rear of the main cabin.

Each plane is equipped with a lavatory including running water, wash basin, iced drinking water, toilet, towel racks and mirrors.

Pilots enter their forward compartment through a door in the floor, without passing through the passenger cabin. The ladder for this entrance folds back under the ship when not in use. The courier is seated in the ante-room behind the passenger cabin.

The radio equipment installed by the Radio Corporation of America, consists of a 100-watt combination telephone and telegraph transmitter operating on 600 to 950 meter wave-lengths. Its source of power is a small dynamotor which draws its current from the standard landing light batteries of the plane. The receiving equipment is designed for frequencies used by the marine stations of the United States Coast Guard and the stations of the Airways Division of the Department of Commerce. The entire equipment for sending and receiving weighs but 145 pounds and was developed by the Radiomarine Corporation of America to use a remote control system of trailing wire antenna.

The biplane type was selected because the wing area necessary for a low landing speed can be disposed with the least overhang or span in this form of construction.

The Curtiss Conqueror V-1570 water-cooled engines of 635 horsepower used in the plane are geared in the ratio of two to one of propeller speed, the propeller turning 1,200 revolutions per minute at the most efficient speed of the engines at 2,400 revolutions per minute.

The pilot and his assistant have unobstructed vision in all directions. The entire front of the ship is glass covered. Windshield wipers are provided for bad weather, although without the third engine there is no danger of clouded windows.

Wheel brakes are standard equipment, as are gasoline dump valves, landing lights, running lights and signal flares. Complete wind tunnel tests show the Condor's controls will be entirely adequate under any conditions in which the ship might be placed either accidentally or purposely.

Maximum cruising range is five hours with the present fuel capacity, at a rate of 116 miles an hour. Unless flights longer than two and one-half hours are scheduled in operation, this range will give a fifty per cent margin of safety in normal flights.

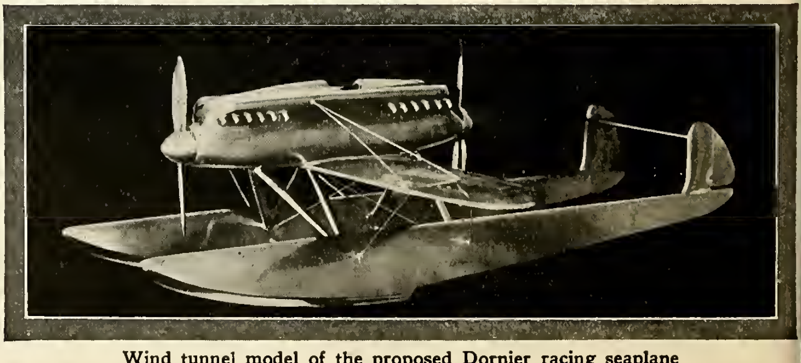
The fuselage structure of the Condor is entirely of metal. All parts are also of metal, including the wing beams and ribs. Cloth covering is used since it is light, durable and easy to maintain and repair.

Specifications

Length overall	57 feet 1 inch
Height overall	16 feet 6 inches
Span overall	91 feet 8 inches
Chord (upper)	108 inches
Chord (lower)	108 inches
Gap	126 inches
Incidence (upper)	1.5 degrees
Incidence (lower)	1.5 degrees
Dihedral (upper)	none
Dihedral (lower)	3 degrees
Wing loading	11.50 pounds per sq. foot
Power loading	14.47 pounds per horsepower
Airfoil section	C-72
Total wing area	1,512 square feet
Aileron area	241.4 square feet
Stabilizer area	145.8 square feet
Fin area	76.6 square feet
Elevator area	47.6 square feet
Rudder area	53 square feet
Weight empty	11,352 pounds
Useful load	6,026 pounds
Fuel and oil	1,916 pounds
Pay load	3,600 pounds
Gross weight loaded	17,378 pounds
High speed	139 miles per hour
Landing speed	49 miles per hour
Cruising speed	116 miles per hour
Rate of climb	870 feet per minute
Service ceiling	17,000 feet
Absolute ceiling	19,200 feet

DORNIER RACER

At the last Berlin Aero Show, the Dornier company had on view a model of its proposed Schneider Trophy Racer, a general outline of which is shown herewith. The design is quite novel and original. It consists of a fuselage with twin engines of 1,000 horsepower each, driving two airscrews in tandem. The pilot is placed between the two engines. By this arrangement, greater horsepower can be installed with the same cross-sectional area as a single engine of existing horsepower. It is proposed to turn up the tail of the floats to form a structure on which to mount the tail plane, on which, in turn, would be mounted twin fins and rudders. Dr. Dornier estimates the high speed of this job to be about 350 miles an hour. The machine is not yet being manufactured but complete wind tunnel work and research have been conducted.



Wind tunnel model of the proposed Dornier racing seaplane

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-TP- Aero Motor Lubricating Oils are new—the latest development in scientific lubrication. They have been tested and approved by leading manufacturers of airplane engines and by many leading pilots. They are straight-run oils, not blended or compounded, produced from pure, paraffine-base crude by a process for which patents are pending.

This process has marked advantages over other methods. It removes all the paraffine wax, while preserving all the lubricating bodies in the crude. Elimination of the wax is responsible for its low cold test.

In terms of performance this means uniform viscosity at all working temperatures, minimum carbon deposit and ignition trouble from fouled spark plugs, easy cold priming, immediate oil pressure, perfect lubrication winter and summer, on the ground or at high altitudes—a maximum of safe flying hours.

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2778

AMERICAN EAGLE

165 HORSEPOWER 5-CYLINDER WRIGHT WHIRLWIND ENGINED

PHAETON BIPLANE

The American Eagle Phaeton in flight over Kansas City.

THE American Eagle Aircraft Corp., has gone into production on its new Phaeton, a three-place biplane powered with a 165 horsepower Wright Whirlwind 5 cylinder engine. The Phaeton is a large, rugged and maneuverable plane having a maximum speed of 135 miles per hour.

Wings are interchangeable (except for the wing walk type), and rigging is accomplished by putting the necessary amount of dihedral in the upper wing only. The airfoil section is the Aeromarine No. 2-A which has a high lift coefficient and is speedy. The wings are rugged in structure, yet not excessive in weight. Four steel compression tubes replace the conventional wooden compression ribs. Web type ribs, new in design and embodying a strong and yet light bracing design, are employed in sets of fourteen to the wing. Macwhyte round type drag wire bracing is used. There are no loops, ferrules or turnbuckles.

The true curvature of the leading edge is retained by a rigid type construction. A mortised leading edge runner grooves into each rib holding all perfectly solid. Over this, back to the trailing edge of the front spar, both on top and underneath, is a plywood facing.

Two sets of Macwhyte flat type streamlined flying wires and one set of the same type landing wires are used. All have the patented Macwhyte safety terminals.

Aileron control is by wires running over a pulley operating in a sheave to eliminate the possibility of a loose wire jumping the pulley. Both wires centralize at the aileron terminals, insuring ease of movement with little strain or effort. The aileron control strut is of the end ball and socket type.

The entire tail group is designed to prevent dampening out of action in aerial maneuvers. The rudder is new in shape. The vertical fin is adjustable on the ground and the horizontal stabilizer is adjustable in flight. Instead of being hinged from the back and adjustable from the front, as has been the case in many types thus far, the Phaeton's horizontal stabilizer hinges at the front and is adjustable from the rear. The horizontal stabilizer is externally braced. The range of adjustment is increased by placing a segment fitting on the hinge adjustment.

The fuselage is 34 inches wide. It is of conventional type construction, being built throughout of seamless chrome-molybdenum steel tubing. To facilitate handling, lifting handles are placed on the lower longerons.

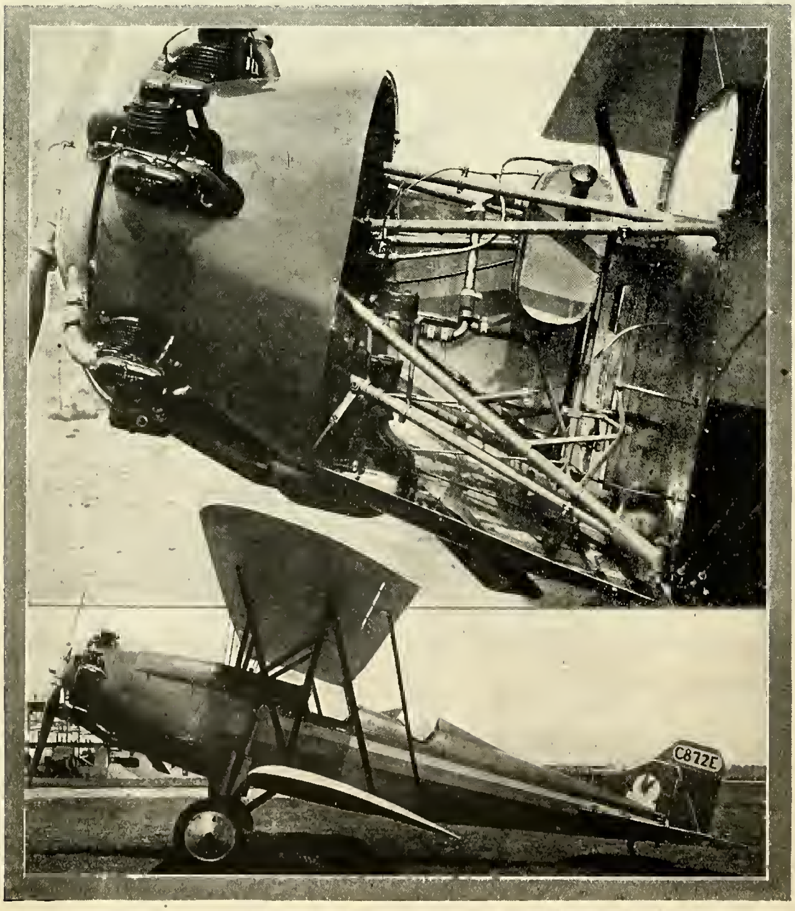
Controls are somewhat new in design. Pedals replace the conventional type rudder bar. A one-piece torque arm rests on two bearings, and the entire stick control mechanism is more rugged in proportion to its weight. The front cockpit controls may easily be disconnected. The stick slips out of its socket by removal of a pin, and removal of two others releases the rudder controls.

The "N" type interplane struts are welded rigid and provide fixed stagger. A stagger of half the chord is employed. Center section struts also are of the "N" type construction and afford a good range of unobstructed vision. Pin type strut connections are provided throughout, placed behind Pyralin inspection plates.

The landing gear is of the split axle type. A specially designed Rusco ring type shock strut is used. Parasitic resistance has been reduced to a minimum in the undercarriage construction. Well streamlined, the undercarriage is of rugged construction. A 40-gallon gasoline tank is placed over the baggage compartment in the front cockpit. An auxiliary fuel tank may be placed in the bagcompartment in the front cockpit.

Performance

Maximum speed	135 miles per hour
Cruising speed	112 miles per hour
Landing speed	35 miles per hour
Take-off	142.5 feet in 10 seconds
Rate of climb to 500 feet	816 feet per minute
Rate of climb to 1,000 feet	716 feet per minute
Service ceiling	16,000 feet
Cruising range	430 miles



Power plant installation and side view of the American Eagle Phaeton.

RYAN—off with 4,000 pounds in 8 seconds

With a speed that blurs its silvered shape, Ryan takes wing. Takes off with load in eight fleeting seconds—275 feet. Of course it gets off the ground fast—its top speed is 140 miles per hour.

Such speed means power at a new peak—the power of the Wright Whirlwind 300-horsepower engine, installed as only Ryan could do the job. The perfected usage of a great power plant.

Ryan-Whirlwind power is given even more punch by safe loading. Ryan's gross loading is extremely low—nearly one-third less as compared with other ships of its type.

RYAN *again!*

At Los Angeles on May 28, two days after the finish of the "Fort Worth" endurance flight, Miss Marvel Crosson of San Diego, in a Ryan Brougham, with Wright J-6 engine, broke the altitude record for women with an official mark of 23,996 feet. The best previous mark was 20,270 feet. Miss Crosson reported perfect functioning of engine and plane throughout the flight.

If you want performance, here it is. If you are thinking of endurance, remember Ryan established a world's record—172 hours, 32 minutes of sustained flight.

Write today for new illustrated catalog. Ryan Aircraft Corporation, Lambert-St. Louis Airport, Anglum, St. Louis County, Missouri.

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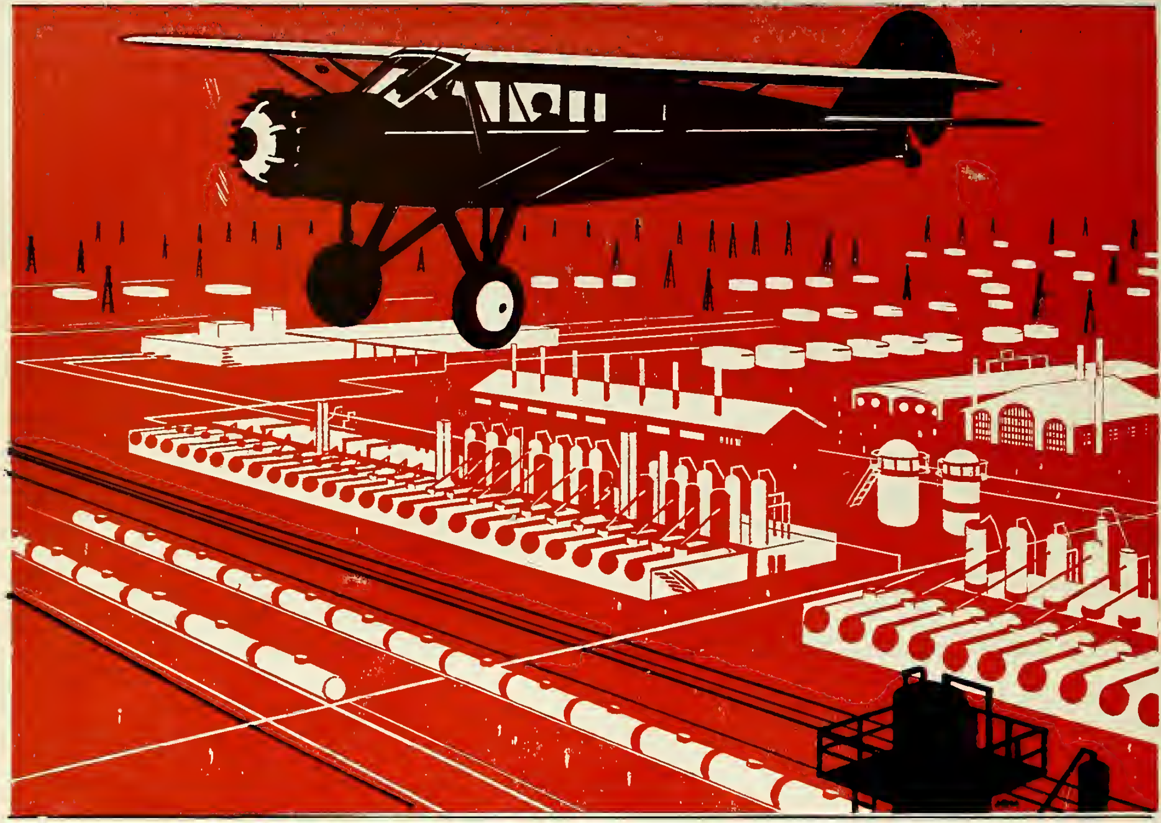

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E.R.

THE E.R. OF THE
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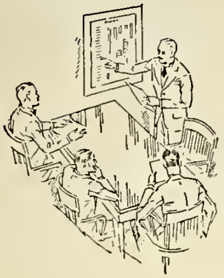
IT FIRST AMONG
ALL METAL PLANES
WRITE FOR DATA



EFFICIENCY RATING

Check ✓

the Efficiency Rating before you buy

A group of executives are ready to investigate the type and kind of planes to equip their air line. Specifications are at hand. They all read in quite the same pattern. So much horsepower, so many passengers, cabin and open cockpit types, etc--but do you know their "dead weight?"

Have You an E. R. Chart?

If you have neglected to furnish your group of executives with an E. R. Chart (Efficiency Rating Chart) then you will not have complete data with which to make your decision.

Among other important factors the E. R. chart supplies you with the weight, empty, of each cabin plane made and its passenger capacity. Divide the weight, empty, by the seating capacity and you arrive at a figure known as the "dead weight" of the plane. "Dead weight" is costly--why pay for more than is necessary.

Of the cabin planes of all metal construction, the Flamingo ranks first, in least amount of "dead weight" per passenger.

The weight, empty, of the Flamingo is 3,370 lbs. Its passenger capacity is 8 including pilot. Dividing its weight by passenger capacity, you have the figure 421 lbs. "dead weight" per passenger. Get the E. R. Chart, make your own comparison and judge accordingly.

ALLMETAL
FLAMINGO

ALLMetal Construction

The Flamingo is of all metal construction, every inch of skin, every strut of the structure.

With the Flamingo, you can discount immediately the "time-out" factor that causes delay and costs in money for repair in the ordinary type plane. The item of overhaul with a Flamingo is negligible.

Wire Us For Plane

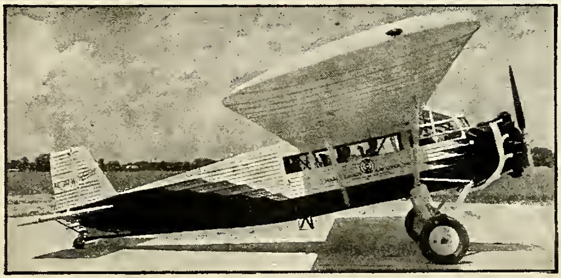
Whether in Alaska or Alabama, send us a wire and we will fly a Flamingo to the door of your hangar. You'll get a demonstration that will be a revelation in modern air performance.

Another important advantage of the Flamingo is its quick, easy, flexible maneuverability on the ground which reduces time consumed and man power to a minimum.

The E. R. of The Flamingo

The Allmetal Flamingo transport has an efficiency rating of second in a list of all the cabin planes built in the United States, of fabric, fabric and metal combination, and all metal construction, in least amount of "dead weight" per passenger.

The Mason & Dixon Airlines, Inc. purchased four Allmetal Flamingos



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THE METAL AIRCRAFT CORPORATION OF CINCINNATI, OHIO

AIR BOSS BIPLANE

THE Air Boss is a two-place training biplane produced by the Southern Aircraft Corporation of Birmingham, Alabama. The plane was designed by Glenn E. Messer, and is produced in the company's recently constructed factory. The Southern Aircraft Corporation has installed jigs for fuselage, wings, control surfaces, and landing gear that will contribute to accuracy of assembly and will insure the interchangeability of parts.

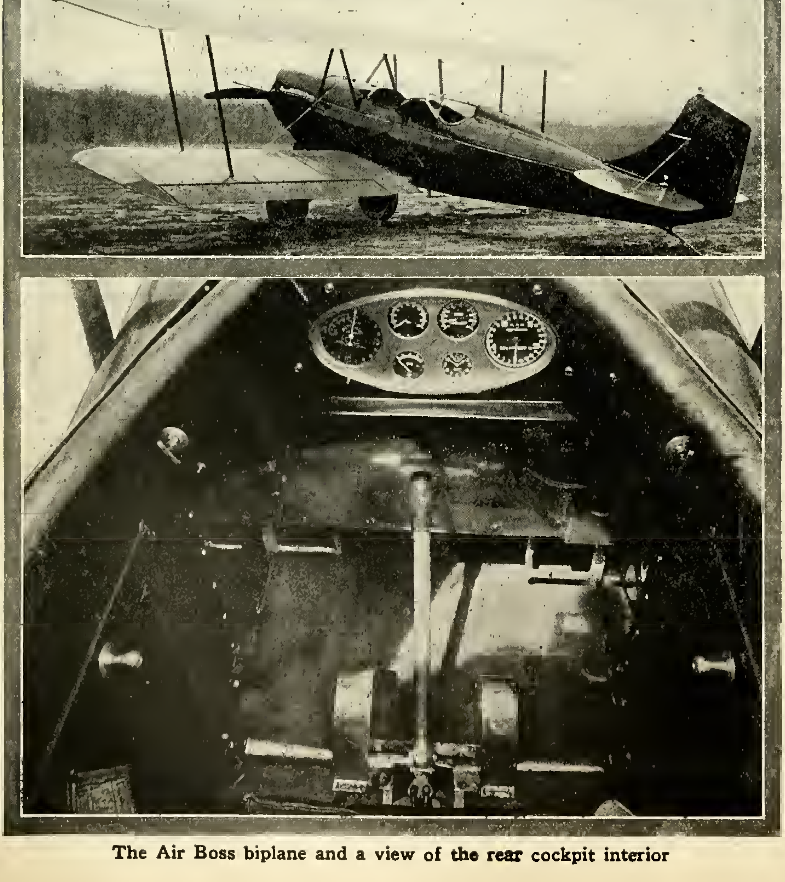
A Curtiss OX-5 engine is used as the power plant in the trainer. All engines are checked on the test stand, and are adjusted in the motor assembly department of the factory before being mounted on the plane. Both the motor mount and the engine cowling are quickly detachable. The radiator below the engine is equipped with shutters.

The wings are braced with two vertical interplane struts, reinforced by streamline drag wires. The fuselage is joined to the upper wing by oblique struts, and the lower wing joins directly to the lower longeron of the fuselage. Only chrome-molybdenum steel is used in the tube construction of the Air Boss. A uniform wing curve is secured by a 3-ply waterproof plywood covering on the leading edges of all wings. Double steamline drag wires are used throughout, and the terminals are inside the wings. All wing fittings, strut, and wire terminal fittings are so arranged as to be inside the fuselage when the plane is assembled. There are no exposed fittings. Wing ribs are jig built of plywood, with spruce caps forming I-beam sections. Extra heavy compression members are used. Wings are wired for navigation lights. Lower wings have wide walkways, direct aileron controls, heavy leading edges, enclosed fittings, and Frise type ailerons extending practically the entire length of the wings.

Much care has been given to the control system and to the arrangement of the controls with relation to the pilot's comfort. The control system is simple and positive. The horizontal stabilizer and the vertical fin are easily adjusted in flight. Controls are of the stick and bar type, the rudder stirrups being equipped with compensating tension springs. Aileron control is direct, without the use of wires, pulleys, horns or rods, since the long ailerons on the lower wings extend close to the fuselage. The control units are thus easily accessible for inspection. Dual controls are supplied for student training as well as both right and left hand throttles.

Both cockpits are carefully designed and fully equipped. The seats are adjustable for height while in flight, and, since the cockpits are located well back in relation to the wings, the pilot has a comparatively unobstructed vision. Both cockpits are protected by wind shields, and a streamlined head rest adds to the pilot's comfort. The fuselage edges are covered with crash pads. The instrument panel is lighted indirectly.

The fuselage incloses a baggage compartment. The landing gear is of the split axle type with a six-foot spread on the ground. Landing tires are 30 by 5. The tail skid is of spring steel and the entire landing gear is built sturdy to stand student landings.



The Air Boss biplane and a view of the rear cockpit interior

Specifications

Wing area	298 square feet
Span (upper wing)	32 feet 4½ inches
Chord (upper wing)	60 inches
Span (lower wing)	30 feet 9 inches
Chord (lower wing)	60 inches
Wing loading	7½ pounds per square foot
Height	9 feet 5½ inches
Wheel tread	72 inches
Weight, empty	1,350 pounds
Weight, fully loaded	2,200 pounds
Useful load	850 pounds

Performance

Cruising speed	90 miles per hour
Cruising endurance	8 hours
Landing speed	30 miles per hour
Take-off	100 feet
Ceiling	17,000 feet
Rate of climb	1,000 feet first minute

NEW BOHNALITE ALLOY

BOHNALITE X is a new light alloy now being produced by the Bohn Aluminum and Brass Corporation of Detroit, Mich.

Bohnalite X is 36 per cent lighter than aluminum and 78 per cent lighter than iron. It is being used for castings, forgings and extrusion forms. The tensile strength of Bohnalite X extruded shapes varies from 38,000 pounds to 47,000 pounds per square inch with an elongation of 10 per cent to 16 per cent. Forged, it shows a tensile strength of 36,000 to 50,000 pounds per square inch with 12 to 18 per cent elongation depending on the particular composition used and its application.

Four grades of Bohnalite X are being produced, the physical properties of which are as follows: Bohnalite X No. 1 sand cast—26,000 pounds per square inch tensile strength, 8 per cent elongation, 44 Brinell, 1.76 specific gravity; Bohnalite X No. 2 sand cast—23,000 pounds per square inch tensile strength, 1½-2 per cent elongation, 57 Brinell; after heat treatment—27-29,000 pounds tensile strength, 3-3½ per cent elongation, 63 Brinell, 1.84 specific gravity; Bohnalite X No. 3 sand cast—28,000 pounds per square inch tensile strength, 7 per cent elongation, 50 Brinell, 1.78 specific gravity; after heat-treatment—31-32,000 pounds tensile strength, 8-9 per cent elongation, 56 Brinell; Bohnalite X No. 4 sand cast—21,000 pounds per square inch tensile strength, 2½ per cent elongation, 45 Brinell, 1.82 specific gravity; after heat-treatment—25,000 pounds tensile strength, 6 per cent elongation, 40 Brinell.

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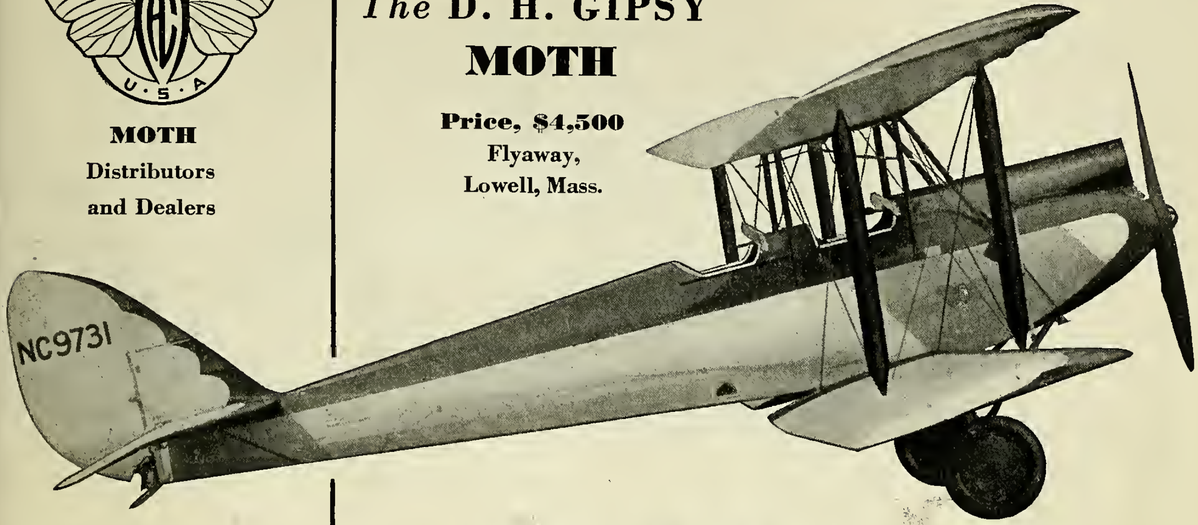

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There is still available some very valuable territory, particularly in the Middle West. The Moth contract is a very fair one—the Moth spare parts policy is a distinct aid to sales, eliminating loss of flying time while waiting for parts from the factory.

If you have the organization and financial backing to qualify you as a Moth Distributor or Dealer, write or wire us at once for full particulars about securing a Moth sales franchise. It will be profitable this year—and an asset of constantly increasing value.

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BEFORE the onslaught of the swift Lockheed Air Express, piloted again by Captain Frank Hawks, two transcontinental records fall! From New York to Los Angeles, and from Los Angeles back to New York in little more than 36 hours flying time! A new record from East to West; a new record from West to East, and both made with Lockheed! It is expected of Lockheed to set new records, for every Lockheed is a champion. Its fighting heart, its tremendous strength and its speed increasing lines make streaking speeds possible with utmost safety! And now, when a new transcontinental record is set, Lockheed will set it, for more than ever before is demonstrated....It Takes a LOCKHEED to Beat a Lockheed!

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Los Angeles, U. S. A.
Lockheed Aircraft Express, Approved Type Certificate No. 102

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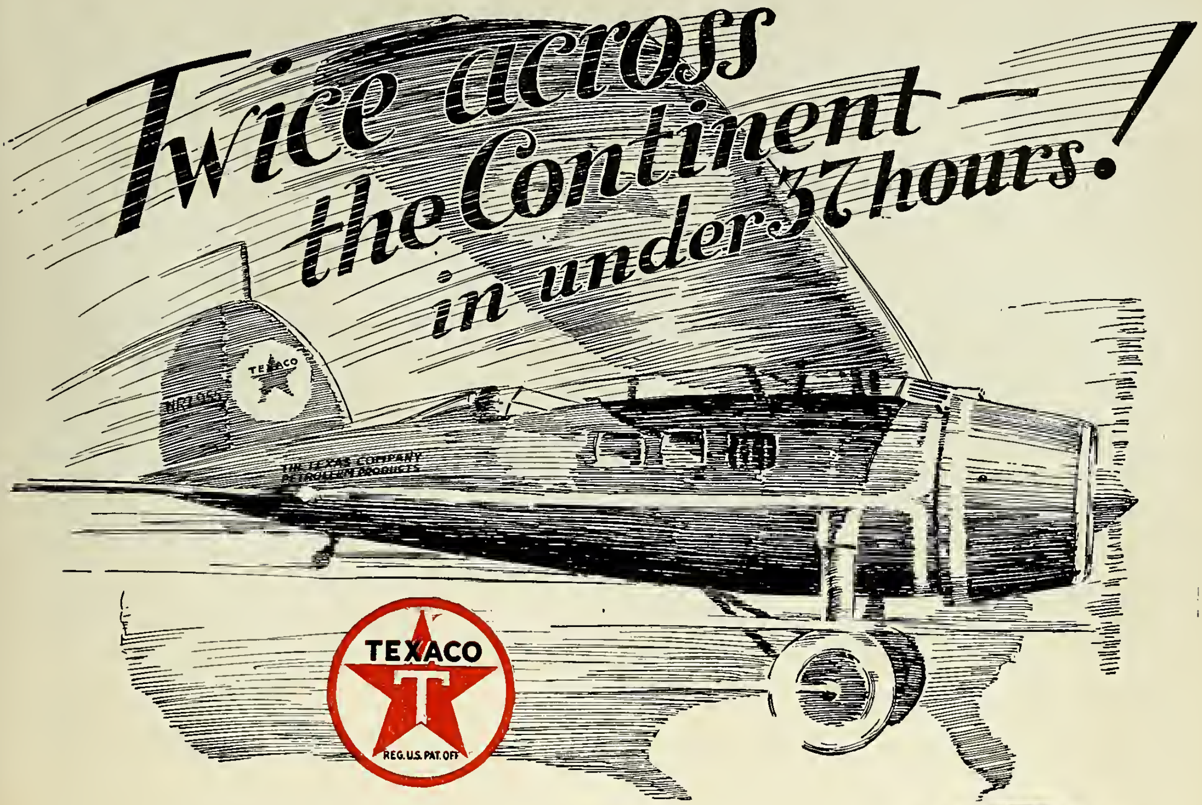
LOCKHEED


Twice across the Continent — in under 37 hours!
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WHEN Captain Frank M. Hawks hurled the TEXACO Number 5 from Los Angeles to New York AND BACK in 36 hours, 48 minutes, 48 seconds he smashed all transcontinental records. Modestly discounting his own iron nerve and navigating skill, he credited his success to "a fine ship, plus good gasoline and oil." As on his other record-breaking flights, Captain Hawks used TEXACO Aviation Gasoline and TEXACO Airplane Oil.

CAPTAIN FRANK M. HAWKS

Superintendent of Aviation Division, the Texas Company, is available to the Aircraft Industry for assistance or consultation regarding lubricating and fuel problems. His services will assure you the advantages of the best modern practice in scientific lubrication with Texaco Products for aviation purposes.

THE TEXAS COMPANY

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AIRPLANE OIL

SEA HAWK FLIES 162.5 M.P.H.

FOR the second year in succession the plane winning the annual Curtiss Marine Trophy Race, held at the Anacostia Naval Air Station recently, was a Model F7C-1, Curtiss Sea Hawk, powered with a Wasp engine. Piloted by Lieut. W. C. Tomlinson, United States Navy, the Sea Hawk covered the 100-mile course at an average speed of 162.52 miles per hour, over 11 miles per hour faster than the Curtiss Hawk which finished second under the guidance of Capt. A. H. Page, Jr., of the United States Marine Corps. The winning plane was equipped with the new N.A.C.A. streamline cowling, which is said to account for the wide margin of its superiority over its competitors. Officials in charge of the contest stated that the speed attained was unusually high for standard service type seaplanes.

Lieut. Tomlinson's Sea Hawk was designed and built for the Navy by the Curtiss Aeroplane and Motor Company as a shipboard fighter, and is one of the first of a recently completed order. It has excellent climb and maneuverability, making it an ideal ship for dog fighting. Since its mission is primarily to operate from aircraft carriers accompanying the fleet, its design embodies special adaptations to conditions to be found at sea. Of major importance among these conditions is the difficulty in landing imposed by limited area available for that purpose aboard carriers. The Sea Hawk was therefore so designed as to reduce this difficulty to a minimum. Nine degrees of sweepback are built into the upper wing to give directional stability in landing, and Frise balanced ailerons, placed in the upper wing only, give positive lateral control at stalling speeds. Sufficient wing area has been provided to give a low landing speed, without sacrificing performance, and finally, the Navy's latest type arresting gear is employed.

The possibility of a forced landing in the open sea had also to be considered. In such an emergency, risk to the pilot is considerably lessened by two flotation bags carried in canvas packs on either side of the fuselage. These can be automatically inflated with carbon dioxide as soon as the plane touches the water. When inflated the bags have dimensions of 6 feet in length by 4 feet in diameter, and provide ample buoyancy to keep the plane afloat. Just enough carbon dioxide is carried to inflate the bags properly without bursting them. If either or both develop a seepage the pilot can replace the escaped gas with air by means of a hand pump.

Additional buoyancy can be derived from the gas tank, which is equipped with a dump valve which can be closed as well as opened. Thus, if the pilot finds a forced landing in the sea inevitable, he can dump his gas and close the valve, thereby sealing the tank.

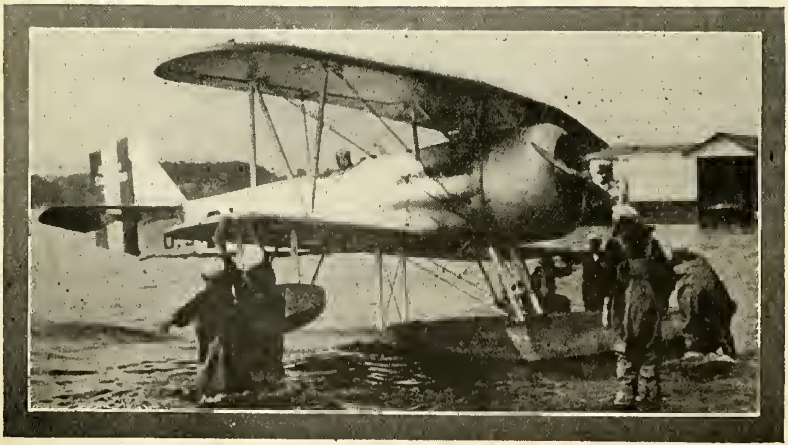
Visibility, always of the utmost importance in a fighting plane, is usually good in the Sea Hawk through the use of a movable seat, by means of which the pilot can raise or lower himself through a range of 10 inches. When the seat is moved the rudder pedals move with it, thus keeping the relation between the two constant. Independent adjustment of the pedals is also possible.

Other interesting devices with which the Sea Hawk is equipped include shutters for the Wasp engine, which can be adjusted in flight, and a hoisting cable which attaches to the center section in only one place instead of four. This cable is always carried with the plane in a pocket located in the upper wing.

Equipment includes two 30-calibre Browning machine guns firing through the propeller, bomb racks for two 100-pound or five 25-pound bombs, signal pistol, and wingtip flares.

Construction of the Sea Hawk follows conventional lines, except for the fuselage. The forward longerons are of steel, since the number of attachments in the cockpit necessitated the use of a material suitable for welding. The longerons aft are of duralumin. Wings are constructed of built-up spruce spans, wood ribs, and fabric covering. Framework of both ailerons and tail surfaces is of metal, with spars of steel and ribs of duralumin, except the rear spars of both vertical and horizontal stabilizers, which are also of duralumin. Both ailerons and rudder are balanced. The landing gear is of steel, and is provided with conventional oleo and spring shock absorbers. Standard Bendix wheels are used.

With the Wasp engine, the Sea Hawk has a climb of well over 2,000 feet per minute, and a cruising speed of 120 miles per hour. It weighs 2,131 pounds empty, and carries a useful load of 759 pounds, 188 pounds of which are devoted to armament. Its gasoline tanks have a capacity of 80 gallons, providing a cruising range of approximately 300 miles.



Lt. Tomlinson's Curtiss Sea Hawk, type F7C-1, with a Wasp engine.

THE AERODIAL

THE Aerodial, manufactured by the York-Wolf Company of Long Beach, Calif., is a device for quickly calculating compass courses. Provision is made for quickly setting the Aerodial to any amount of variation up to 45 degrees east or west.

Deviation is allowed for automatically on the Aerodial. It is not necessary to know either the amount or direction when the disk has been marked for the compass it is used with. Drift may also be allowed for on the Aerodial, with the possibility of applying it incorrectly being eliminated.

The Aerodial is compact, utilizing little space. It may be carried in the pocket or mounted anywhere desired, since it is made of non-magnetic materials to eliminate effect on the compass.

MacCLATCHIE L-HEAD ENGINE

AFTER two years of experimentation and development, the MacClatchie Panther, an L-head radial engine, will soon be tested for its Department of Commerce Approved Type Certificate, according to an announcement made by J. Warren MacClatchie, head of the MacClatchie Manufacturing Company of Compton, California. A 2000-mile trip was made by a Panther-powered plane recently, and the engine was afterwards given intensive block tests, and minor refinements were instituted. T. C. Alexander is MacClatchie's chief engineer, and piloted the Panther-powered plane on the trip.

The Panther is a seven-cylinder, four-cycle engine, weighing approximately 390 pounds. It has a bore of 4½ inches and stroke of 5½ inches. It is rated at 150 horsepower at 1,850 revolutions per minute.

The outstanding features of the Panther include an overall diameter of only 35 inches, and the elimination of rocker arms, long push rods and other allied parts, simplifying lubrication, servicing and inspection. The valve assembly is so constructed that it is possible to remove a valve, grind it, and replace it in fifteen minutes. The flow of air completely encircles all of the valves to provide cooling.

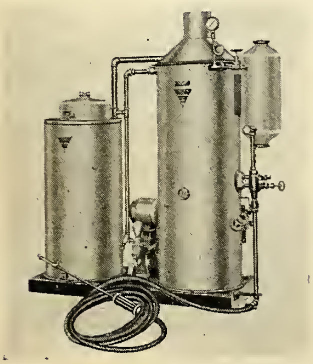
Production of the 150 horsepower engines will be started upon the issue of an Approved Type Certificate. The first section of a $200,000 plant has already been erected and equipped with machinery.

TRIDEX *used by* T.A.T.

Keeps Planes Glistening Clean

TEXAS Air Transport has solved the problem of how to keep mail and passenger air transports clean and attractive. TRIDEX machines have been purchased by this company for use at many airports. Now, regardless of wet fields and other conditions which result in mud-splattered and grease covered ships, T. A. T. cleans flying equipment in one-third the time with a tremendous saving in labor and a great increase in thoroughness of the resulting job.

TRIDEX is operated by one man or may be equipped for the cleaning of two planes simultaneously by two men using one Tridex Machine. At airports Tridex proves itself a money-maker and time saver.



The TRIDEX principle is the application of a fine spray of softened, warm, soapy water. The fine spray is applied with only moderate pressure, and the solution dissolves and washes away dirt, grease and discolorings much more effectively than can be done with high-pressure application of cold water, or by the old slow and laborous scrub brush method.

TRIDEX is the only successful motor cleaner. The spray reaches every part of the most intricate motor surface and dissolves and washes away the grease and dirt that collects in pockets, between cooling fins, etc., leaving the motor surface absolutely clean. TRIDEX also cleans motors taken down for top or general overhaul, and any parts needing repair are instantly disclosed.

Our Model G, fully enclosed, was especially designed for airport use. Fill in and mail today the coupon, which will bring you complete information and prices.

MAIL THIS COUPON

The Guiberson Corporation, Dept. A.,
Box 1106, Dallas, Texas

Gentlemen: Please mail me, without obligation, full information and prices on your Tridex Cleaning Unit.

NAME..
STREET..
CITY..
STATE...

R. R. Safford Company, Exclusive Southwestern Distributors
P. O. Box 931, Dallas, Texas

To the best of our knowledge no Bohn Ring True Bearing in an aircraft engine has ever failed – never!

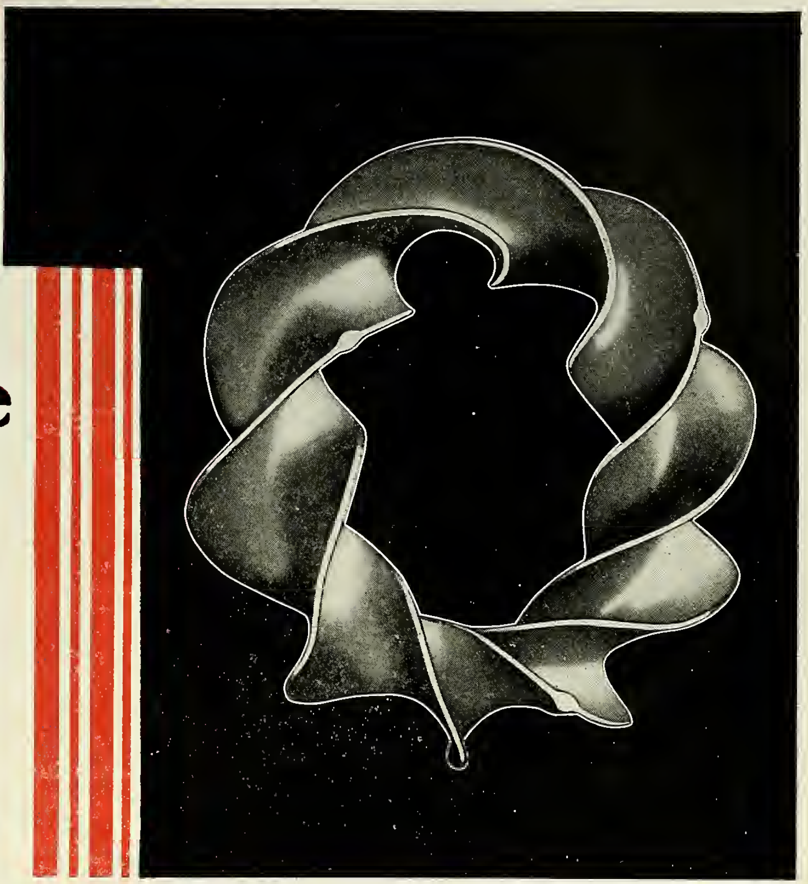
RING TRUE BOHN BEARINGS

Aircraft Division

BOHN ALUMINUM & BRASS CORPORATION, DETROIT, MICHIGAN

New York , Chicago , Philadelphia , Cleveland , Pittsburgh

A Unique Triple Spiral Casting made of



BOHNALITE

62% LIGHTER THAN IRON

Here is a most unique aeroplane engine part made of Bohnalite.

This is called a Triple Spiral Casting and it goes in the intake manifold of one of the standard engine designs.

More and more are aeronautical engineers specifying Bohnalite for castings. They realize that lighter weight means a big economy in the long run.

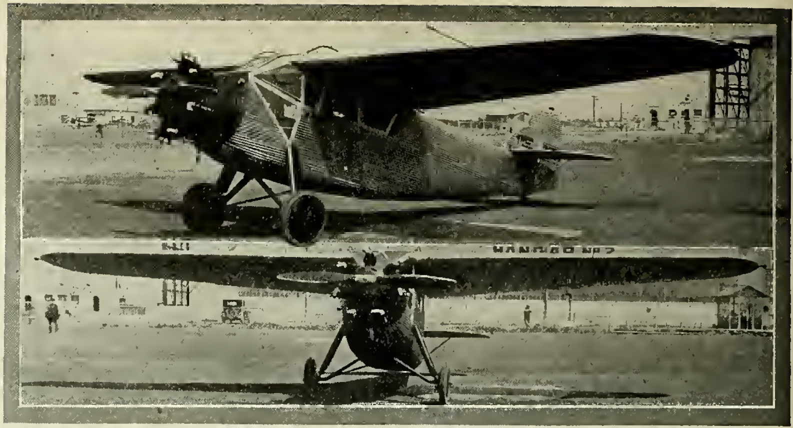
Bohn metallurgists have spent years in specializing on aircraft requirements. Their knowledge of metals and special heat treatments, known only to this organization, is at your service.

Send blue prints and samples. Let us assist you in advancing and refining your product.

Aircraft Division

BOHN ALUMINUM & BRASS CORP., DETROIT, MICH.
New York Chicago Philadelphia Cleveland Pittsburgh

THADEN
TYPE T-2
MONOPLANE



The all-metal Thaden cabin monoplane carries three passengers and pilot.

THE Thaden T-2 monoplane embodies a number of features unusual in American aircraft construction besides its all-metal structure. It has wing-flaps, a multi-spar wing and a monocoque fuselage which render it sturdy and capable of high performance.

The new plane, the second type to be turned out by the Thaden Metal Aircraft Company, is a high-wing monoplane with a full cantilever wing and cabin accommodations for two or three persons and the pilot.

The power plant is a seven-cylinder Comet radial engine, developing 150 horsepower at 1,800 revolutions per minute. The ship has a top speed with this engine of 121 miles an hour. The plane can also be equipped with a Whirlwind engine, giving additional speed. The ship is equipped with a Westinghouse Micarta propeller.

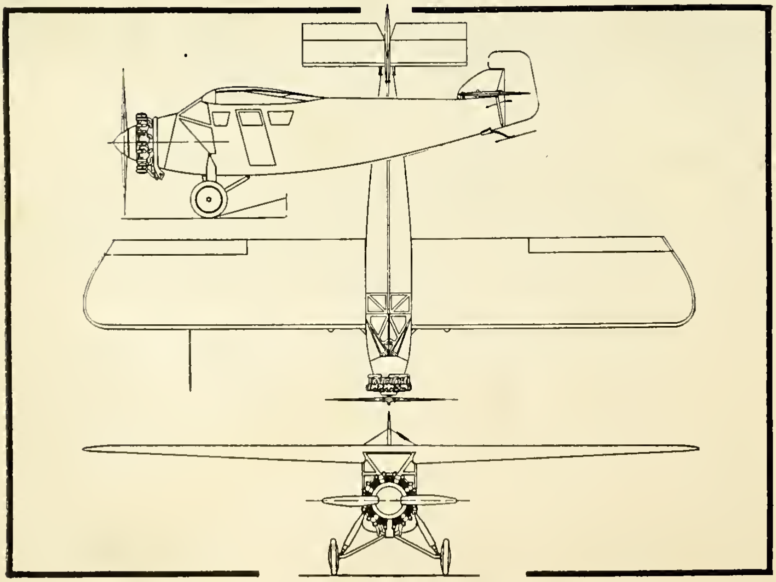
According to the manufacturers' claim, the plane is exceptionally stable in flight; on its test flight it was flown "hands off." It is extremely responsive to control, takes off quickly and climbs rapidly.

The wing is a true cantilever, built up on five duralumin channel type spars. The skin of the wing itself provides the drag bracing and there are no ribs. Any three of the spars are adequate to sustain the plane in flight with a good factor of safety. The wing has been static tested in a high incidence position to a load of 19,000 pounds with maximum deflection of only seven inches at the wing tips and without any sign of deformation, broken rivets, etc.

The fuselage is a true monocoque, braced at the forward end by the welded steel tube engine mount and by duralumin beams which extend aft beyond the cabin door. There is no longitudinal bracing whatever in the fuselage aft of this point, the corrugated duralumin sheathing providing ample rigidity. There is, however, transverse bracing in the form of tubular duralumin bulkheads. These are spaced closer together toward the tail of the ship, the better to absorb the shocks of landing.

Control surfaces are built up of duralumin channels and the same corrugated sheathing as is used on wing and body. They are triangular in section and rigid. All except the flaps are actuated through steel cables over Micarta sheaves. The flaps are controlled through a self-locking wheel and worm. The handle of this gear is just above and to the right of the pilot; with it he can adjust the flaps in any position between extreme depression, when they reduce the landing speed of the plane nearly 10 miles an hour, and straight out in line with the wing.

The flaps and ailerons together represent about 20 per cent of the total lifting area.



The Thaden T-2 monoplane has a full cantilever wing.

The landing gear is of the split axle type, built up of heat-treated chrome molybdenum steel tubing, welded together. Gruss air shock absorbers are introduced into the compression columns. Bendix wheels and brakes are used. The brakes are arranged for either point or differential control, rendering the plane easy to handle on the ground. The tail skid is a steel leaf spring.

The cabin, including pilot's section, is approximately four feet square and eight feet long. Bulkheads built up of tabular duralumin shapes are located at the rear of the cabin and just aft of the pilot's seat, giving great transverse rigidity to the structure. The forward one is cut out to allow easy access to the pilot's compartment, where there is an emergency door, and the after one has an opening leading to a large baggage compartment. The visibility of this plane is unusually good. Almost the entire front end of the cabin is of glass, enabling the pilot to see ahead, on both sides, above, down on either side to a point well inside the wheels and aft to a point beyond the wheels.

The transparent panel over the pilot's seat is mounted so as to slide up and back with one easy motion, yet its angle is such that the slipstream tends to hold it in place rather than lift it. Thus this panel becomes a convenient emergency exit, accessible to both pilot and passengers.

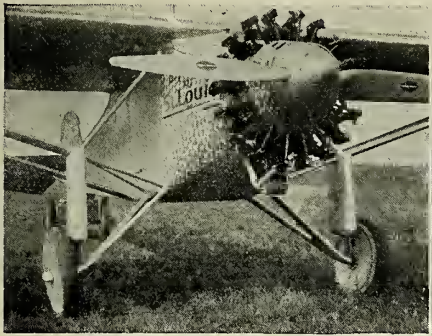
The inside of the cabin is finished in steel gray, the pilot's section in terne plate, and the passenger section in mohair. There are convenient windows on both sides of the cabin, adjustable at the will of the passengers, and the walls are well insulated against cold and sound.

The seating arrangement was designed after that of an automobile—a bucket seat for the pilot, a wide lounge-type seat across the back of the cabin for the normal passenger complement and a folding seat swung from the right wall of the cabin for an extra passenger.

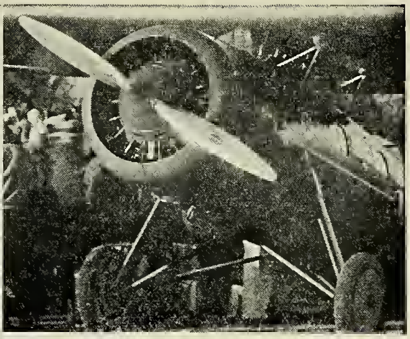
Gasoline is carried in two 20-gallon tanks and an emergency 10-gallon tank, all feeding the carburetor through separate fuel lines.

The T-2 has been subjected to unusually severe tests, both static and flight. It has

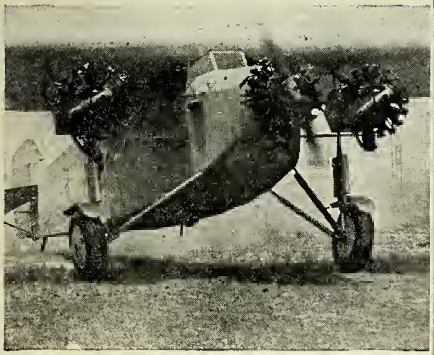
(Continued on next page)



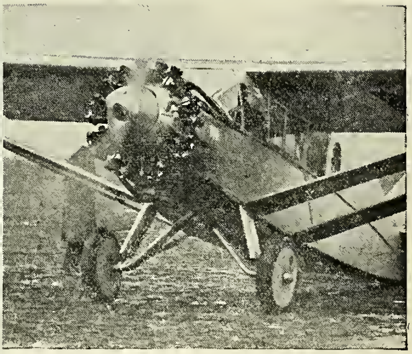
Lone Eagle Lindy



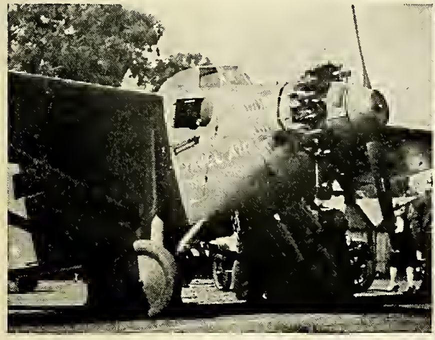
Dawn-to-dusk Hawks



America to Australia with Kingsford-Smith

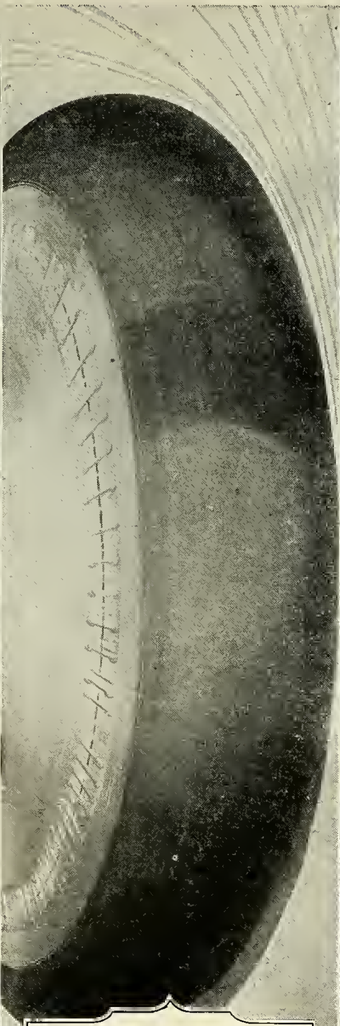


To Germany with Chamberlin and Levine



Dole Derby Goebel

World-circling Brock and Schlee



The "Split-Second" Silvertown Airplane Tire with Stream-line Shield—an exclusive Goodrich feature.

SPLIT-SECOND-SILVERTOWNS

Many World Records have *Proved* these tires

THE records of Aviation might well be termed "the records of Goodrich Silvertowns." For though many record-breaking flights have been made with many different makes of planes, propelled by several different makes of motors, in *almost every instance these record-breaking planes have been equipped with Goodrich "Split-Second" Silvertown Airplane Tires.*

Goodrich Silvertowns are *light* enough to permit three *extra* gallons of gas. *Strong* enough to withstand *take-off* overloads . . . and the shock of forced landings even on barren, rock-strewn mountain sides of unknown lands. No mere claims need be made for *"Split-Second" Silvertowns . . . world records have proved them!*

The B. F. Goodrich Rubber Co., Established 1870, Akron, Ohio. Pacific Goodrich Rubber Co., Los Angeles, Calif. In Canada: Canadian Goodrich Co., Kitchener, Ontario.

Goodrich ◆ *Rubber for Airplanes*

(Continued from preceding page)

been rolled, spun, looped and otherwise stunted without the slightest indication of failure in any part. The fuselage has been subjected to a simulated load factor of six and a half tons.

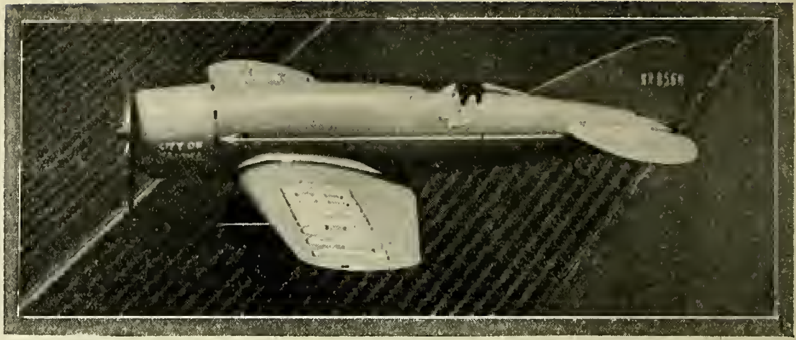
The plane has removable wing-panels, subjecting every part of the wing to quick and easy inspection, which are a patented Thaden feature. The design is by H. V. Thaden, general manager of the company.

Specifications

Span	39 feet
Length	24 feet 11 inches
Height	7 feet 9 inches
Maximum chord	8 feet
Wing area	225 square feet
Wing loading	12.5 pounds
Fuel capacity	50 gallons
Oil capacity	6 gallons

Performance

High speed	121 miles per hour
Cruising speed (1,650 r.p.m.),	100 miles per hour
Rate of Climb	800 feet per minute
Service ceiling	14,000 feet
Landing speed (without flap),	55 miles per hour
Landing speed (flap down),	46 miles per hour



The new low-wing Lockheed monoplane, "City of Tacoma," in flight

LOCKHEED LOW-WING MONOPLANE

A SPECIAL Lockheed low-wing monoplane, designed for a flight across the Pacific Ocean to Japan, was completed recently at the factory of the Lockheed Aircraft Company, Los Angeles, Calif., for Lieut. Harold Bromley of Tacoma, Wash.

The low-wing Lockheed plane, fitted with a N.A.C.A. cowling, will make the 4,700-mile trip to Tokio in 33 hours at an average speed of 142 miles per hour, according to Lieut. Bromley.

The *City of Tacoma*, as Lieut. Bromley's plane is named, follows the general design of the Lockheed Air Express high-wing monoplane in all respects other than the position of the wing, power plant, and landing gear. It is the first low-wing and the largest plane ever built by the Lockheed firm. The wing span on the ship is 48 feet 5 inches, 7 feet greater than that of the Air Express used by Capt. Frank Hawks on his transcontinental flights. In changing the full-cantilever wing to the low position, the plywood monocoque fuselage has been streamlined over the upper surface of the wing.

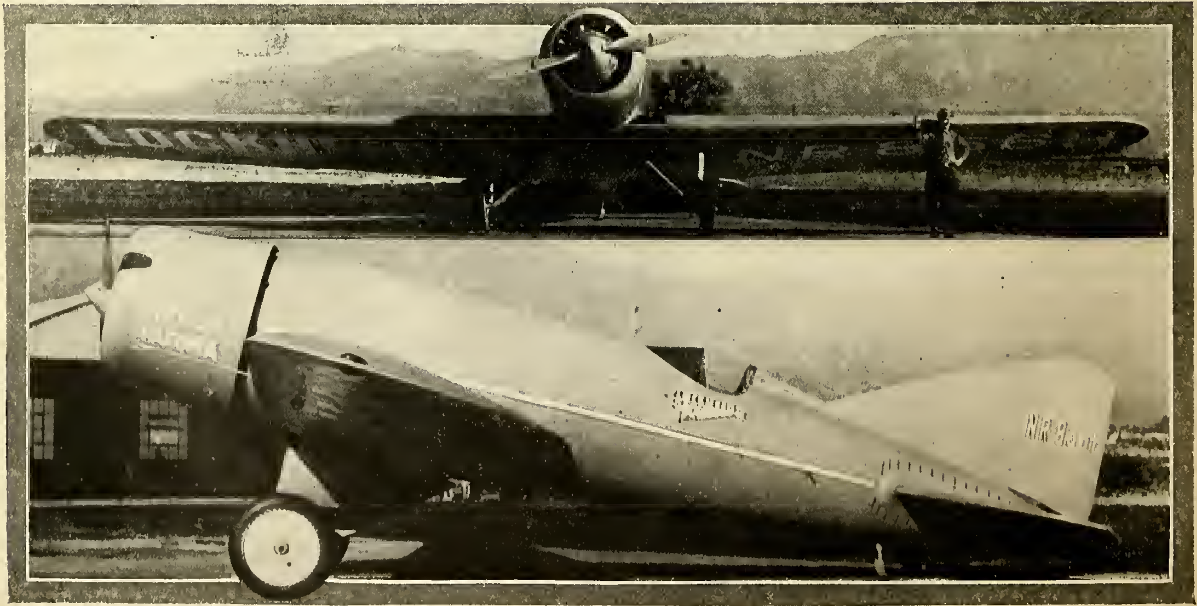
The ship is powered by a Pratt & Whitney Wasp engine of 420 horsepower. On tests with this power plant the plane has developed a speed of 179 miles per hour; with minor changes, a high speed of 185 miles per hour and a cruising speed of 150 miles per hour is expected.

The landing gear of the *City of Tacoma* is unique in a Lockheed plane. Two oblique struts streamlined together lead from the wheels to the under side of the wings directly under the intersection of the fuselage and wings. Vertical streamlined shock-absorbing struts extend from the wheels to the wings, instead of to the side of the fuselage, as is the usual Lockheed gear design.

The vertical fin in the specially designed plane slopes straight to the fuselage, instead of presenting a rounded front outline, and the cockpit has been moved back in the fuselage farther than the cockpit of the Air Express, giving a larger fuel-carrying area. The gas tanks hold 890 gallons of gas, enough for forty hours' flight, or, according to the flier, enough to fly 1,000 miles beyond his goal. Twenty-five gallons of oil can be carried.

The plane is equipped with a five-watt radio set, operating on 36.18 meters, with a range of 700 miles. Maritime frequencies 5,525, 11,050, 16,575 kilocycles and the working frequencies 555, 1,110, and 16,660 kilocycles have been allocated for use by the plane by the Federal Radio Commission.

As AERO DIGEST goes to press, Lieut. Bromley has flown his ship non-stop from Los Angeles to Tacoma, Wash., a distance of 1,070 miles.



Front and side views of the N. A. C. A. venturi-coweled low-wing Lockheed monoplane

Production

TO build ships in sufficient numbers to effect substantial economies in manufacture and distribution—but to maintain at all times a more than ample margin of safety in each process of construction—that is the production creed of the Great Lakes Aircraft Corporation.

While modern equipment and modern progressive assembly methods make it possible to produce a ship a week for each thousand feet of floor space, quantity must never be attained at the expense of quality.

Every piece of material that goes into a Great Lakes plane is laboratory tested.

From the rigid inspection at each successive step in its assembly to the flight test of the completed plane, safety and reliable service are uppermost in the minds of every man who has to do with its construction.

But back of the care in production, back of the testing and the inspection—experienced engineering has developed a sound, fundamental design that makes the finished product a delight to handle, an extremely economical means of transportation, a rugged, serviceable ship—with a startling record for performance.

Production—yes, constantly increasing orders demand it—but leadership is never attained on quantity alone. It is quality that builds success.

The Great Lakes plant at Cleveland is in production—quality production. You are invited to visit it—to see its eighty acres of ground—its landing field—its hangars—its laboratories—its engineering department—its production facilities—and to meet the young, aggressive organization that is taking such an important place in the development of American air transportation.

Number Six of a series of fact-statements regarding a new Industrial leader—
GREAT LAKES AIRCRAFT CORPORATION

GREAT LAKES AIRCRAFT
CORPORATION CLEVELAND

Military and Commercial Airplanes · · Seaplanes and Floats · · Aluminum Alloy Parts

THE LOENING MONOWHEEL AMPHIBION GEAR

THE Grover Loening Co., Inc., recently introduced its new monowheel amphibion device fitted to a standard Moth biplane. The ship was test flown by B. Allison Gillies, chief test pilot for the company, who landed and took off successfully with the new single wheel gear.

The amphibion gear consists of a single main float 17½ feet long, 30 inches wide, and side floats of a very simple welded duralumin construction. The single wheel mechanism raises and lowers in a pocket in the hull. Its operation is synchronized with that of doors that open and close the pocket according to the position of the wheel. The raising and lowering mechanism is of a new type, consisting of two toggle levers so hinged that, when the wheel is out, the toggles are locked for carrying the load. The construction used is combined with balancing springs for the weights in such a way that about one second is required for raising or lowering the wheel by a lever in the cockpit. The shock absorbing is taken on rubber discs.

Including the seaplane floats together with the amphibion landing gear, a total of 80 pounds has been added to the weight of the original Moth plane. The plane thus weighs 1,020 pounds, light. Preliminary tests indicate that the amphibion gear has reduced the high speed of the plane only about four miles per hour. The flying characteristics of the plane are relatively the same as they were with the original landing gear.

The new design is simple and well streamlined. The protection against injury to the side floats that is given by the skids, and the protection to the main keel, given by the wheel, promise to reduce greatly the chances of damage to an amphibion construction on land.

The history of the development of this amphibion device goes back several years. Grover Loening's basic patent on single wheel amphibions was applied for in 1924. Shortly thereafter, Mr. Loening endeavored to interest the Army Air Corps in the development of an amphibion of this type. Army experts at McCook Field equipped an old training plane with a single wheel landing device, and in coöperation with them, this plane was brought out and tested early in 1926. The plane took off and landed with ease, balancing perfectly on a single wheel; it had no serious tendency to ground loop and was at that time shown to be fundamentally practical. A contract was then entered into with Loening, and the development of the device for the Army Air Corps is in process. Meanwhile, further development indicated that the single wheel gear ought to be especially suitable to a light-weight amphibion. The single float gear with side floats well adapted to the smaller size plane because of its protection to the propeller from spray and the rigid manner in which the water landing stresses are carried to the plane's structure.

Grover Loening and his monowheel-equipped amphibion, Moth biplane.

MOTH SEAPLANE TESTS

THE first Moth seaplane produced by the Moth Aircraft Corporation, Lowell, Mass., was recently test flown. The ship was specially fitted with Edo floats. Powered with the Gipsy 85-100 horsepower engine, the plane took off the water in 12 seconds. With pilot and passenger, it left the water in 14 seconds; and with the motor throttled to 55 per cent of its power, the seaplane took off in one minute 55 seconds with two persons aboard it.

ABSORPTION DYNAMOMETER

AN absorption dynamometer for use in testing steam turbines, steam engines, aircraft engines and automobile engines is being built by the Murray Iron Works Company, located at Burlington, Iowa.

This dynamometer is built to absorb capacities from the lowest up to 2,000 horsepower. It consists of from 1 to 10 discs revolving in compartments formed of series of diaphragms. Because of its rotation, the water, when admitted from the tank at the top of the brake, in entering the casing is thrown to the circumference by centrifugal force and there forms a ring at all times. As the discharge valves are closed off or the inlet valve opened, increasing the braking water surface against the discs, the load is increased or vice versa.

The casing is cylindrical and supported on roller bearings so as to permit rocking and recording the torque on a scale beam. The main bearings of the dynamometer are deep groove ball bearings for the smaller sizes and self-aligning turbine bearings with forced lubrication for the larger sizes. The bearing supports are so arranged that all the losses are recorded as load on the scale beam, eliminating all corrections.

AQUATITE PLYWOOD

AQUATITE plywood was developed by the engineering department of the Crescent Panel Company, Louisville, Kentucky, as a waterproof plywood which is light in weight, strong and water resistant.

Aquatite is glued with Casein glue and treated by a patented process for the purpose of rendering the adhesive insoluble in water. The treating process is of such a nature that the glue joint is rendered immune from attack by fungi, which destroy many glue joints when moisture, heat, and lack of air circulation are contributing elements to fungus growth.

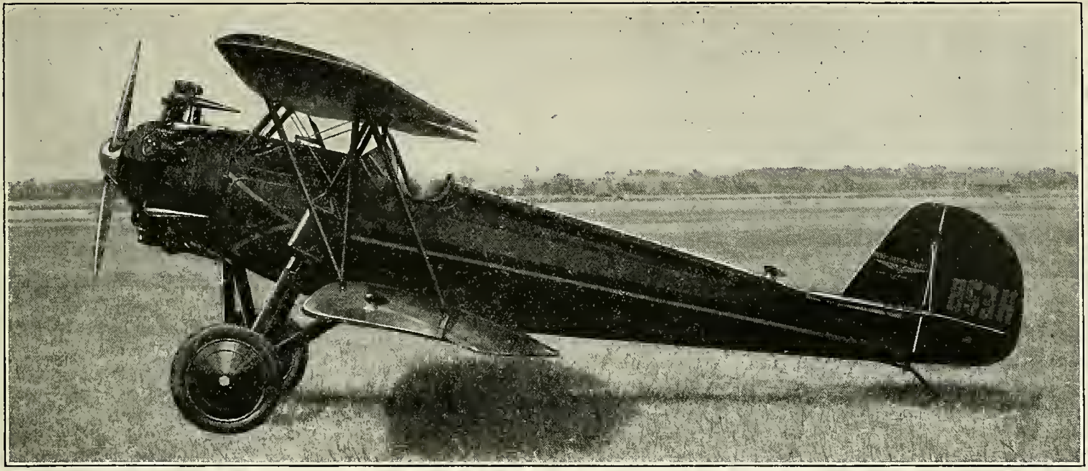
Army Air Corps specifications 82-6A require dry shear test values of 300 pounds per square inch and shear test values after soaking 48 hours of 160 pounds per square inch. The following are representative values of the different thicknesses of Aquatite and all are average test values determined by either Air Corps or Navy inspectors:

	MAHOGANY		BIRCH	
	Dry	*Wet*	*Dry*	*Wet*
1/16" 3-ply	459.9	292.5	438.8	261.0
3/32" 3-ply	446.4	290.7	463.5	325.7
⅛" 3-ply	.....	.....	374.4	271.0
5/32" 3-ply	.....	.....	428.4	253.8
¼" 5-ply	.....	.....	426.0	275.4

After soaking Aquatite in water for 48 hours, a glue line of unusual strength exists.

Since lightness is a prime requisite in the manufacture of airplanes and motor boats, the following weights in pounds per square foot show that the strength and durability of Aquatite have not been attained by adding a penalty of excess weight:

	MAHOGANY	BIRCH
	Weight in pounds per	*square foot*
1/16" 3-ply	.22	.27
3/32" 3-ply	.29	.36
⅛" 3-ply	.37	.44
3/16" 3-ply	.54	.61
¼" 5-ply	.77	.84
⅜" 5-ply	1.00	1.11



ANNOUNCING

The Arrow Sport Pursuit

There's a new Arrow Sport "100" in the air—Kinner powered, and it's arousing as much enthusiastic comment among men who know their ships as did its flying mates, the "60" and the "90".

It fills the school operator's need for an economical ship both husky and stable for primary training, yet with the added power, speed and maneuverability for advanced acrobatics.

These same characteristics make it the ideal ship for commuting, sport and business, for—like the other Arrow Sports—its initial cost and upkeep are amazingly low, and its slow landing speed and quick take off get it safely in and out of the smallest fields.

Fly it—soon! Let us send you the name of the nearest distributor.

The Arrow Sport franchise, backed by a factory with ample resources and a production of 3 ships a day, is still available in a few desirable territories. Wire for information.

Performance Data—Full load
Arrow Airport-Havelock
Altitude 1150 feet

High Speed	125 m. p. h.
Cruises	110 m. p. h.
Lands	45 m. p. h.
Climbs	975 feet per minute
Range	350 to 500 miles

PRICE $4565—flyaway, *equipped with altimeter, tachometer, Pioneer compass, oil pressure gauge, gasoline gauge, engine thermometer, navigation lights.*

ARROW AIRCRAFT AND MOTORS CORPORATION
Havelock, Nebraska

DAYTON ENGINE

THE Dayton Bear four-cylinder in-line air-cooled motor is manufactured by the Dayton Airplane Engine Company of Dayton, Ohio. It has aluminum alloy heads on nickel-iron cast cylinders. The manufacturer's rating is 110 horsepower at 1,550 revolutions per minute or 120 horsepower at 1,800 revolutions per minute. It has a bore of 4.5 inches, stroke 7.0 inches and a displacement of 445 cubic inches. This engine is adaptable either as a tractor or pusher, without change, since a double ball thrust bearing is provided at the propeller end.

The rotation of the crankshaft is right hand and the firing order is 1-2-4-3.

With double magnetos, propeller hub and necessary accessories, the complete engine weighs 375 pounds. The engine carries three gear pumps, oil out or sump pump, oil in or pressure pump and a C5 fuel pump. Full force feed lubrication is provided to all plain bearings in the engine. The ball bearings are oil sprayed. Although the engine is of the dry sump type, it can easily be converted to a wet sump with low carburetor.

The sump has a capacity of 2½ gallons of oil. Oil should be drained from the crankcase after 20 hours of flying and the oil screen cleaned.

The crankshaft is five bearing, held in place by babbitted steel-backed main bearings, which in turn carry their load through to the cylinder head by long through-bolts, thus relieving the crankcase of explosion strains. These through-bolts clamp the cylinder heads upon the cylinders, the seal being made by metallic gaskets. By the removal of ten nuts and two oil connections, all four heads may be removed for inspection or grinding. The cylinders may also be lifted off individually for further inspection.

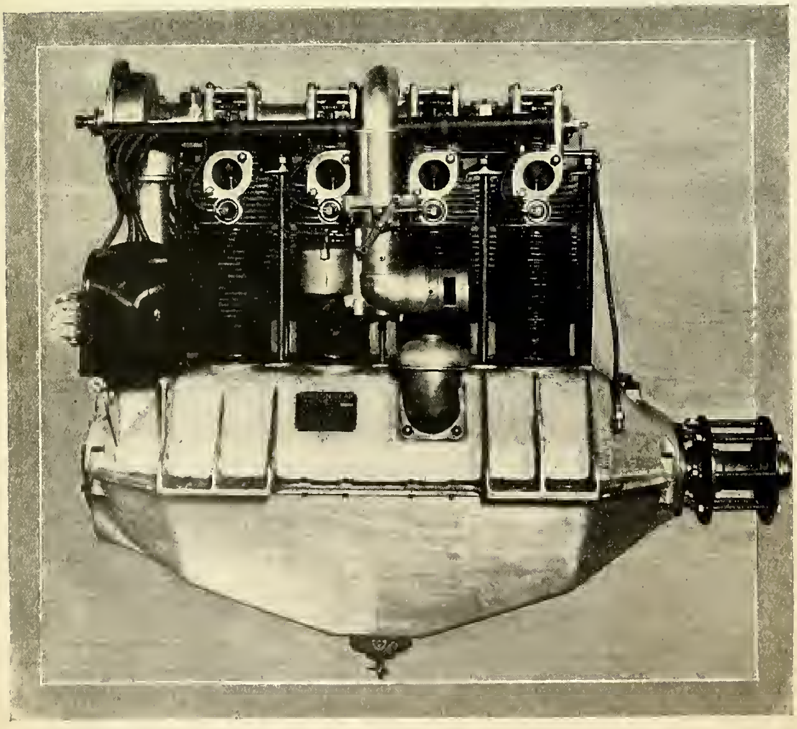
The aluminum crankcase carries all bearings mounted in the upper half, so that the lower portion, or sump, may be removed for inspection without disturbing the crankshaft. The sump oil pump is located in the sump submerged in oil. Baffle plates are inserted above the oil level to prevent excessive splashing.

The aluminum alloy cylinder heads have spherical compression chambers, with overhead valves seated in aluminum bronze seats. Two diametrically opposed bronze bushed spark plug openings are directly below the valves. To insure equal pressure on all cylinder heads where the through-bolts are anchored, equalizers with ball seats are used.

The cylinders are simple finned barrels of nickel-iron. The aluminum alloy pistons have three narrow rings near the top and are floated on the piston pin. The connecting rods are steel forgings of the I-beam section machined all over.

Specifications

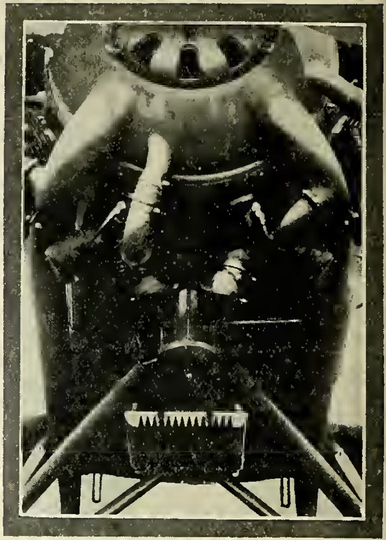
Bore	4.5 inches
Stroke	7.0 inches
Compression ratio	5.3 to 1
Rated horsepower at 1,550 r.p.m.	110
Rated horsepower at 1,880 r.p.m.	120
Weight	375 pounds
Height	38½ inches
Width	18½ inches
Length	47⅝ inches
Fuel consumption per b.h.p. per hr.	.475 lb.
Oil consumption per b.h.p. per hr.	.0175 lb.



Carburetor side of the 110-120 horsepower Dayton Bear engine.

AIR HEATER AND CLEANER

AN air heater and cleaner for use on aircraft engines has been developed by the Buhl Aircraft Company, Marysville, Mich., and is to be used as standard equipment on the Buhl Airsedan. The new heater and cleaner is located below the engine at the rear of the carburetor.



The Buhl air heater installation.

The device consists of a streamline shell which bolts below the carburetor. Within the shell is enclosed an air cleaner of the mutiple screen type. The hot air is drawn into the shell through a stove on one of the exhaust pipes. It then passes through the cleaner and into the carburetor. The cold air is admitted to the shell through a pair of doors in the front, these doors being controllable from the cockpit.

When the doors are fully opened, only cold air is admitted to the carburetor because the outside air comes in under strong pressure resulting from the plane's velocity and the suction of the carburetor draws the hot air in over the stove. When the doors are partially opened, the cold and hot air mix in the shell, the exact temperature being indicated by a thermometer installed near the cleaner and within the shell. By means of only the one control, this temperature may be maintained at any desired degree ranging from the normal air temperature to the full hot condition.

The use of this device provides a quick warm up condition. Moreover, during the warming up operation, when most dirt is encountered, all the air must pass through the cleaner whether it is drawn in through the stove or through the cold air opening.

The cleaner insures that the mixture fed to the cylinders will contain no dirt or other foreign particles from the air and this, of course, minimizes one of the causes of scored cylinders, fouled plugs and other engine troubles.

From the Ground Up

B/J

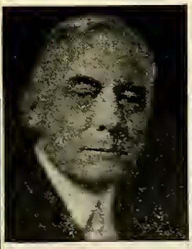
Is Building the Plane of Tomorrow

THE B/J organization did not grow. To design and build the new B/J plane this company has deliberately drawn together outstanding leaders in every department of aircraft design, engineering and manufacture; such men as—

- Henry A. Berliner, Vice-President, designer and builder of the Berliner helicopter and monoplane, and President of the absorbed Berliner Aircraft Company.
- Frank S. Hubbard, Chief Engineer, an experienced technical department executive head, and well known consultant on design.
- William Wait, Jr., Chief of Design, design engineer of many of the most successful and best known airplanes, including Schneider and Pulitzer Trophy racers.
- Earl P. Osborn, Chief of Structures, an experienced stress analyst with valuable experience in propeller manufacture and as chief of structural section.
- William H. Miller, Chief of Research, designer of the wind tunnels at Massachusetts Institute of Technology and experienced in aerodynamic research work.
- Thomas E. Pell, Factory Superintendent, formerly factory superintendent of the Naval Aircraft factory at Philadelphia.

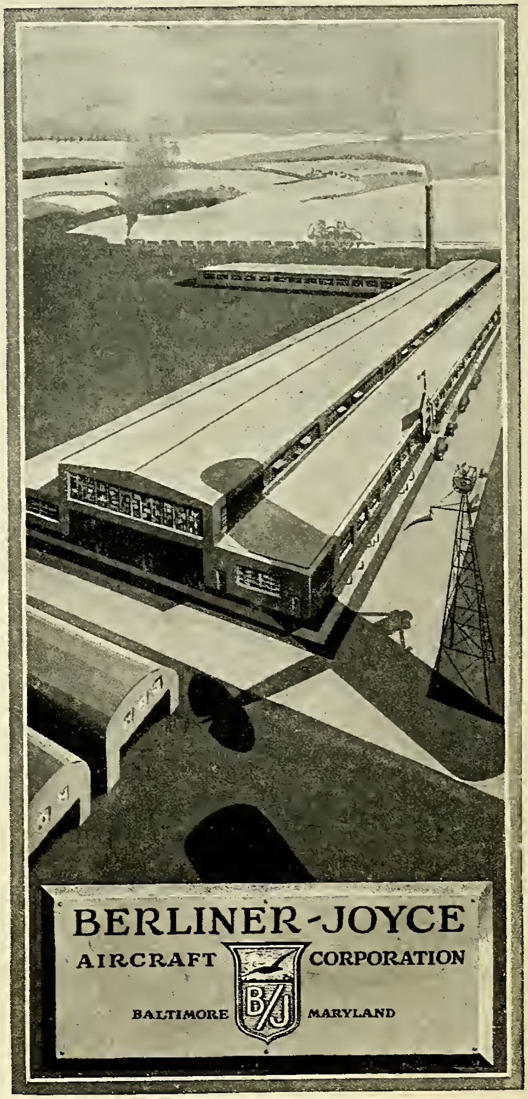
A balanced staff of seasoned experts such as these is building the new B/J from the ground up—up to standards that are certain to make it "*The Pacemaker of the Air.*" You may, indeed, expect great things of the new B/J.

TEMPLE N. JOYCE,
B/J *Vice-President, in charge of Sales*



W. W. MOSS,
B/J *President*

HAROLD A. BACKUS,
B/J *Chief of Materials*



COMING events cast their shadows before—and there is coming not only the new B/J Plane but the new B/J sales plan and advertising, establishing for B/J Planes a pacemaking position in the consciousness of airminded Americans. Built in a new quarter-million dollar plant with every facility for high-quality, low-cost production, B/J Planes will be "Pacemakers of the Air" in saleability as well as in performance. Write to G. Roger Coats, Commercial Sales Manager, Berliner-Joyce Aircraft Corporation, Baltimore, Md., for advance information about the B/J sales plan.

THE LUBLIN RX MONOPLANE

By Paul E. Lamarche, Jr.

THE aircraft factory of E. Plagei T. Laskiewicz of Lublin, Poland, has recently introduced on the European market a new plane known as the Lublin RX. The builders of this new monoplane are the oldest aircraft manufacturers in Poland and have in the past built Ansaldo and Potez planes under license for the Polish government. Their latest product was designed by Georges Rudlicki, an engineer of the Lublin plant who previously designed two other successful military planes, the R-VIII and the R-IX which were the first planes built entirely in Poland.

The RX monoplane has a parasol wing and is built for army liaison work, though it is readily adaptable for carrying mail. It is built with a semi-thick wing supported on each side by oblique braces of sectional tube covered by duralumin. The greatest thickness of the wing is 11 inches. The center section is made thinner to give better visibility. The ailerons, which are not compensated, are hinged to a supplementary spar and are operated by a system of levers. The construction of the wing is of wood with two spars and the usual ribs, and is covered with fabric.

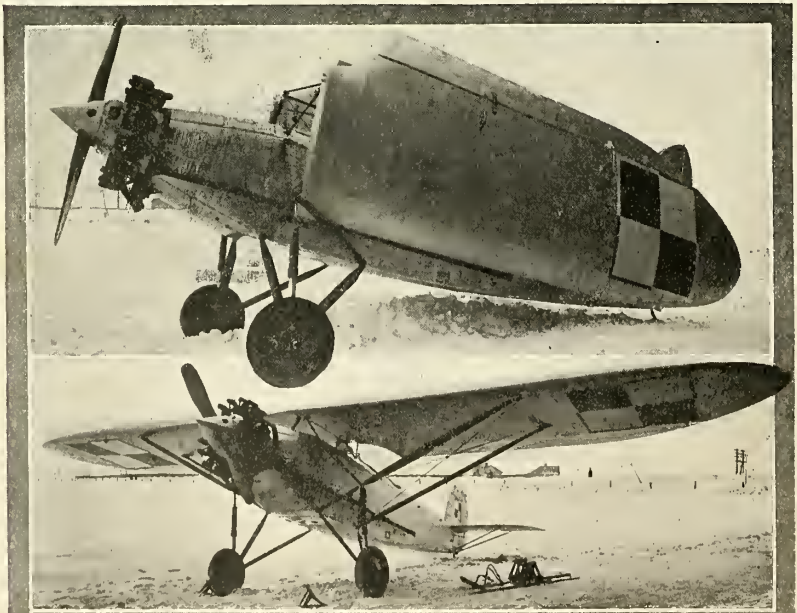
The fuselage is of hollow steel tubing with welded joints. In shape it is rectangular with an arched top. The forward section is protected by duralumin, the rest being covered by fabric. The pilot's seat is placed in front in order to allow better visibility. The seat of the observer is immediately behind and close enough to permit easy communication with the pilot. The section of the fuselage which encloses the seats is 35 inches in width and gives ample space for the installation of a comfortable seat. The controls are dual, and either can be removed at will. The rudder, stabilizers, and elevating plane are of covered steel tubing and are actuated by levers as in the case of the ailerons. The wings can be folded in 30 minutes and without interfering with the control system, though the stabilizer is folded with the wings.

The plane is equipped with an American Wright Whirlwind engine which is mounted on steel tubes fixed by four bolts which permits an easy change of the motor or its accessories. The same mounting also provides for the use of other types of engines. On either side of the fuselage are silencers which have been proved very effective. The sound of the engine is hardly noticeable on the ground when the plane is flying at 800 or 1,000 feet high with these new silencers. The fuel tank is placed in the center of gravity of the plane in a specially isolated compartment. It is attached to a hook system so that it can be dropped. The propeller is of wood, with metal covering at the tips.

The landing gear is hollow sectional steel in V form and is equipped with American Aerol oleopneumatic shock absorbers. The plane can land and take off with skis in place of wheels in the winter time. The construction of the plane is rugged but at the same time simple. The safety coefficient is n=10.5. In flight the plane has shown very good qualities. Take-offs and landings are made easily, and the plane is suitable for all forms of acrobatic flying.

Specifications

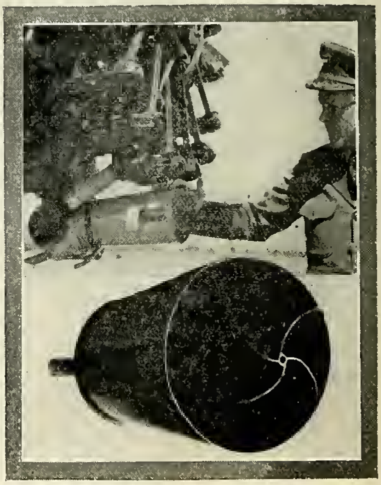
Span	45 feet
Length overall	27 feet 7 inches
Height	9 feet 9 inches
Maximum chord	7 feet 3 inches
Total wing area	280 square feet
Weight empty	1,980 pounds
Useful load	880 pounds
Maximum weight loaded	2,860 pounds
Wing loading	10.2 lbs./sq. ft.
Power loading	12.4 lbs./h. p.
Maximum speed	111 miles per hour
Minimum speed	40 miles per hour
Ceiling	20,000 feet
Take-off run	133 feet
Landing run	267 feet
Cruising radius	5 hours



The folding-wing Lublin RX monoplane is flown with wheels or skis.

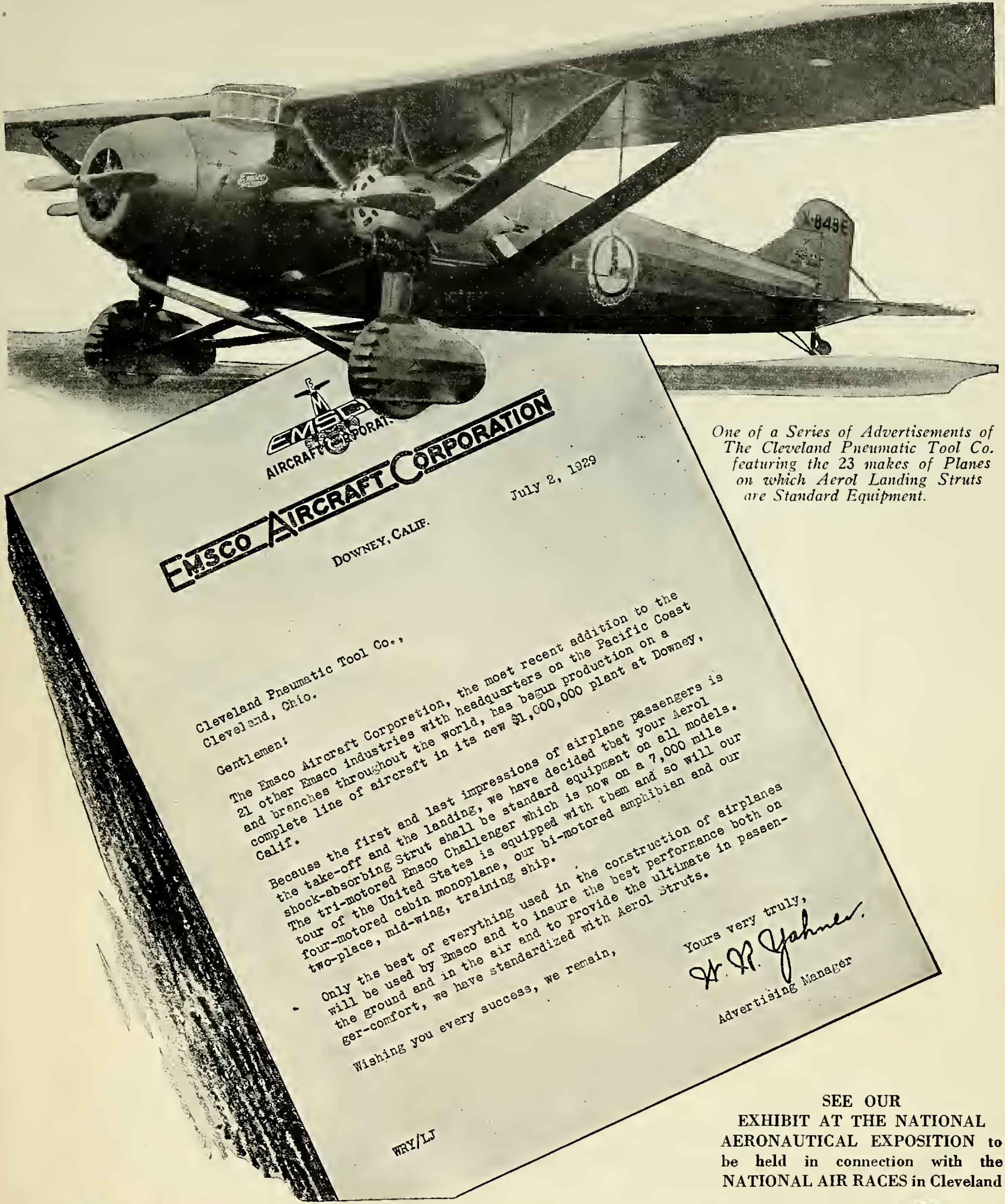
CLEANER-BOOSTER

AN invention known as a cleaner-booster, completed recently by Commander Karl Smith at the North Island Naval Air Station, San Diego, was developed as a means of preventing water from entering the carburetor of a seaplane taking off in rough water. To test his device, Commander Smith played a full stream from a ¾-inch garden hose into the mouth of the cleaner while the airplane engine ran at full throttle. The only effect noted was a loss of 20 revolutions a minute. The engine did not miss fire once.



Commander Smith's cleaner-booster.

Three principles have been incorporated in it. First, after the manner of an expanding nozzle, the air is made to rush through it. Second, the pitot-static principle is applied; and third, centrifugal elimination action is embodied. It is mounted, mouth forward, directly below the engine in the propeller blast. Air comes in through a coarse screen which is fastened across the mouth to stop rocks and heavier particles and to break up the water. It hits four helical vanes and is put through a swirling motion for 135 degrees. At the same time with decreased area provided toward the rear, there develops a tendency to throw dirt outward. Water, it is known, has a tendency to stick to a surface and skin friction holds most of the moisture. As water passes to the rear in a whirling motion on the skin of the shell, it is caught by the external lip which discharges it at the bottom.



EMSCO AIRCRAFT CORPORATION
EMSCO AIRCRAFT CORPORATION
DOWNEY, CALIF.

July 2, 1929

Cleveland Pneumatic Tool Co.,
Cleveland, Ohio.

Gentlemen:

The Emsco Aircraft Corporation, the most recent addition to the 21 other Emsco industries with headquarters on the Pacific Coast and branches throughout the world, has begun production on a complete line of aircraft in its new $1,000,000 plant at Downey, Calif.

Because the first and last impressions of airplane passengers is the take-off and the landing, we have decided that your Aerol shock-absorbing Strut shall be standard equipment on all models. The tri-motored Emsco Challenger which is now on a 7,000 mile tour of the United States is equipped with them and so will our four-motored cabin monoplane, our bi-motored amphibian and our two-place, mid-wing, training ship.

Only the best of everything used in the construction of airplanes will be used by Emsco and to insure the best performance both on the ground and in the air and to provide the ultimate in passenger-comfort, we have standardized with Aerol Struts.

Wishing you every success, we remain,

Yours very truly,

W. R. Yahner

Advertising Manager

WRY/LJ

One of a Series of Advertisements of The Cleveland Pneumatic Tool Co. featuring the 23 makes of Planes on which Aerol Landing Struts are Standard Equipment.

SEE OUR
EXHIBIT AT THE NATIONAL
AERONAUTICAL EXPOSITION to
be held in connection with the
NATIONAL AIR RACES in Cleveland

AEROL *shock absorbing* STRUT

AIR-ISTOCRAT MONOPLANE

THE Air-istocrat parasol monoplane is the product of the United States Aircraft Company of New Jersey. Mr. Frank Seescock is designer and engineer. The Air-istocrat is powered with the 100 horsepower Kinner 5-cylinder radial engine. The plane is so constructed that there is room for only two persons, tools and handbag; consequently, the plane cannot in any way be overloaded, even to its maximum allowance.

According to the manufacturer, safety was considered first in designing the Air-istocrat. A strong motor mount, with ample room between motor and fire wall, reduces the danger to the passenger in case of accident. A small door to front cockpit which offers the least resistance to air pressure when opened in emergency, all gas lines and fittings on motor side of firewall, chrome-molybdenum heat-treated steel tubing construction throughout (except the wings), a center section tank in addition to two wing tanks connected to the motor in such a way that either can be considered as a reserve tank and other such safeguards are characteristic of the construction of this plane.

Other features are good streamlining, ease of operation due to the high ratio of lift to drag, stability of flight, and economy of upkeep and operation. All parts of the plane, except the upper portions of the wings, can be reached from the ground. All controls and engine parts are easily accessible for overhauling.

Landing gear is of split axle type with oleo struts said to be capable of standing an impact landing shock of 1,500 pounds. Frise ailerons and adjustable stabilizers are used.

Standard instruments are altimeter, oil gauge, gasoline gauge, tachometer, oil pressure gauge, thermometer switch, primer and throttle control.

The plane is fitted with pontoon fittings and can readily be converted into a seaplane.

The plane will take off in less than four seconds within sixty to seventy feet and will attain an altitude of approximately 1,200 feet within a minute.

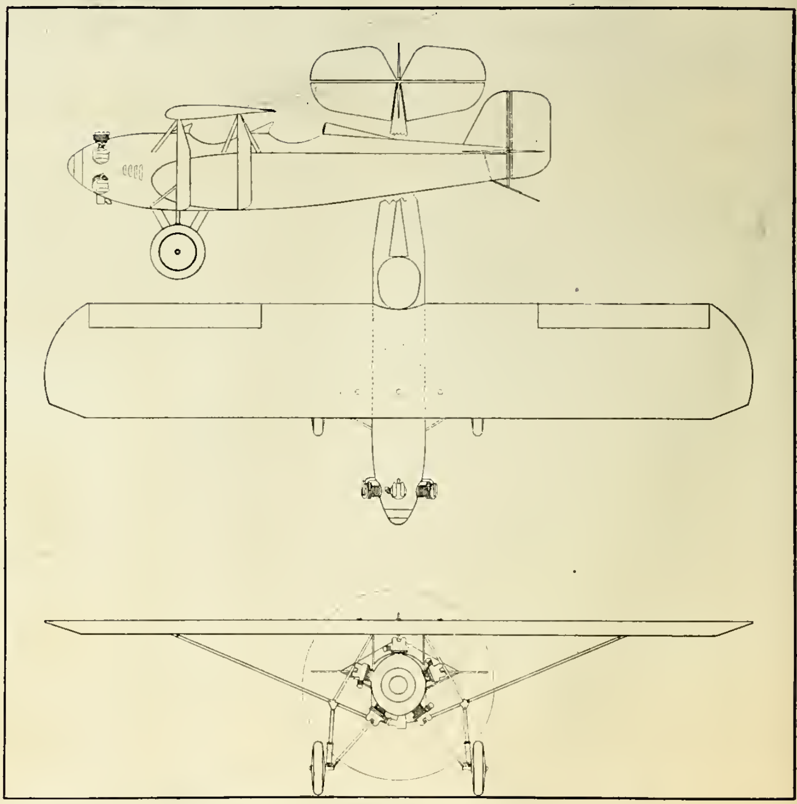
The motor is attached with ten bolts to a motor ring, which in turn is connected to the fuselage by eight arms and four strong fittings. These points of contact are insulated with leather washers, thereby reducing vibration to a negligible degree.

Dual control, brakes, self starter, metal propeller, pontoons, cockpit covers, NACA cowl and compass are extra, but all planes are so constructed that these can be added with little trouble or necessary adjustment.

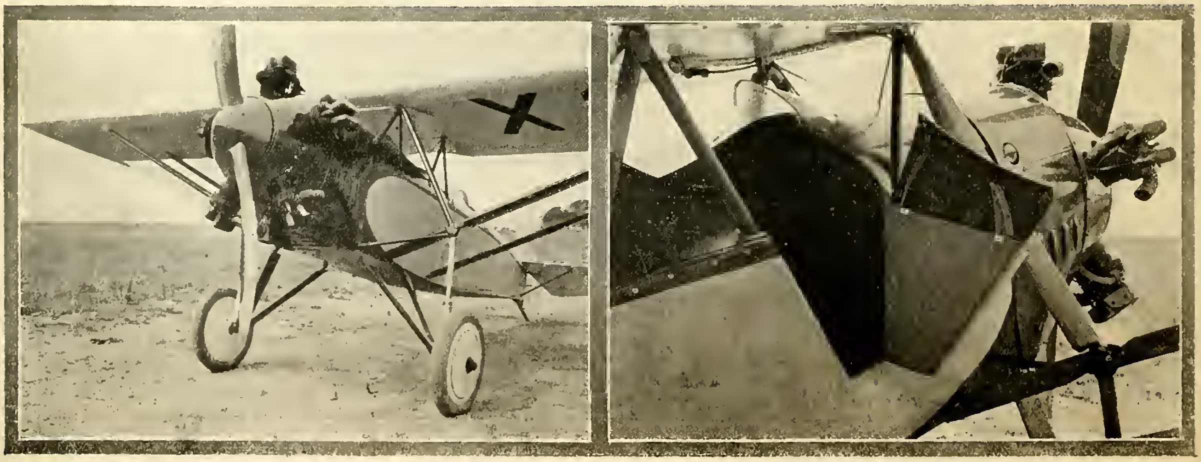
The fuselage, landing gear, wing V-struts, center section, motor mount, center section struts and tail group are made in structural steel jigs and are interchangeable. $\frac{5}{32}$-inch special aircraft steel cable is used for controls, throttle connection is of steel tubing, landing gear, pontoon wing struts and all other fittings exceed the safety margin required for government approval.

Wings are of wood, the spars being of

(*Continued on next page*)



Three-view outline drawings of the Air-istocrat monoplane.



Close-up details of the engine and forward cockpit of the Air-istocrat monoplane.

Starting on the World's Longest Air Tour Equipped with . . . "*Scarab*" Engines

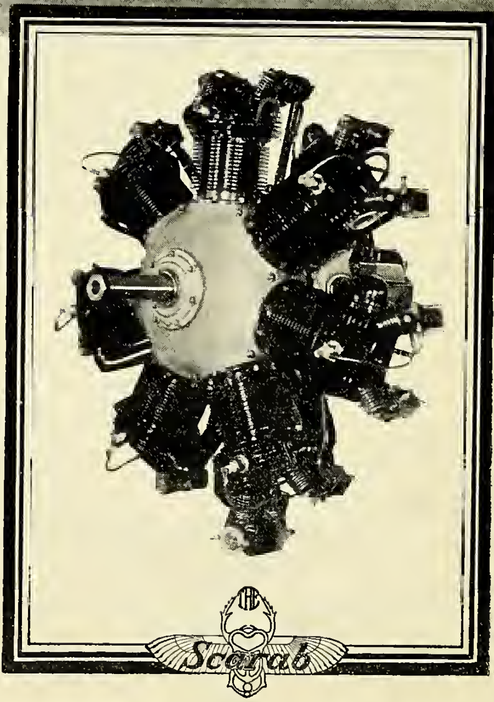
These standard 3-place cabin monoplanes were purchased by The General Tire & Rubber Co. for the 50,000 mile tour of the U. S., Canada, Mexico and Cuba.

An air tour scheduled to last through a solid year of flying was started from Washington, D. C., on June 21st.

This tour will furnish one of the most complete studies of airplane performance ever attempted.

Six Aristocrats made by the General Airplane Corporation of Buffalo, powered with 110 H.P. Warner air-cooled motors, and recently bought by the General Tire and Rubber Company of Akron, comprise the test-fleet.

Needless to say we are delighted that Warner Scarab Engines have been selected for such a tour, and that they have been given this opportunity to demonstrate their dependability on scheduled flights under all conditions.



110 H. P. 1850 R. P. M.

Weight 275 Lbs.

WARNER "*Scarab*" ENGINES

WARNER AIRCRAFT CORPORATION . . DETROIT, MICHIGAN

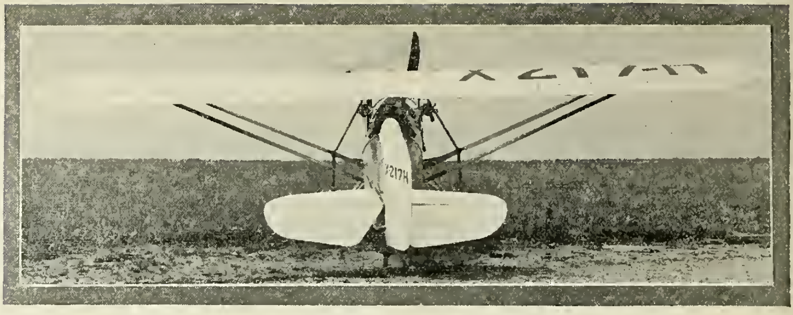
(Continued from preceding page)

spruce. Webs are of bass plywood, and every third rib is a compression rib. All bays are reinforced with cadmium coated aircraft tie rods. Landing edge is also of plywood. Ailerons are of plywood, and control is inside of wing. All landing gear and wing struts are streamlined with balsa wood, and center section V-struts are made of streamline steel tubing.

The seats are of steel tubing built integral with fuselage. Upholstery is of maroon leather with comfortable cushions. Fabric is covered with five coats of clear dope by brush rather than spraying to insure that the cloth is thoroughly permeated. All bolts, nuts, streamline wires, thimbles, hinges, shackles, cables and the tie rods used in the internal drag bracing of the wings are cadmium coated to prevent rust. The fuselage, motor mount and all steel tubing assemblies are oil-lined to prevent rusting on the inside of tubing. The outside surface is protected with a coating of metal primer.

Oil and gas tanks are of aluminum, and all line tubing and fittings are of brass and copper especially made for the aircraft trade. Wings before being covered are sprayed with clear lacquer as a protective coating. The rudder post is chrome-molybdenum steel tubing with thick wall and is casehardened, as is all tubing which serves as a bushing or bearing. Alemite fittings are placed on all bearing surfaces.

The conventional leaf spring type tail skid is used. Propeller is especially made for the Air-istocrat, being of wood, metal edged.



Rear view of the Air-istocrat two-seater parasol monoplane.

Specifications

Span	28 feet 3½ inches
Length overall	20 feet
Chord	54¾ inches
Fuel capacity	34 gallons
Weight empty	870 pounds
Weight loaded	1,409 pounds
Useful load	550 pounds
Landing speed	38 miles per hour
Cruising speed	100 miles per hour
Top speed	128 miles per hour
Cruising range	600 miles
Take-off	4 seconds, 60 to 75 yards
Gas consumption	20 miles per gallon
Climb	1,100 feet per minute

THE MAC AIRLINER

THE McMullen Aircraft Company, Tampa, Florida, recently produced a seven-passenger cabin monoplane, known as the Mac Airliner. The ship was designed as a mail, passenger and express carrier. The plane is powered with a single Liberty motor, rated at 410 horsepower at 1,700 revolutions per minute. An Aeromarine hand inertia starter is provided. A metal Hamilton propeller is fitted.

The wing struts are designed to contribute lift.

The airfoil section is the M 6, a combination high-lift and speed wing. Both the wings and fuselage are constructed of welded steel tubing. The wings are wired for navigation lights.

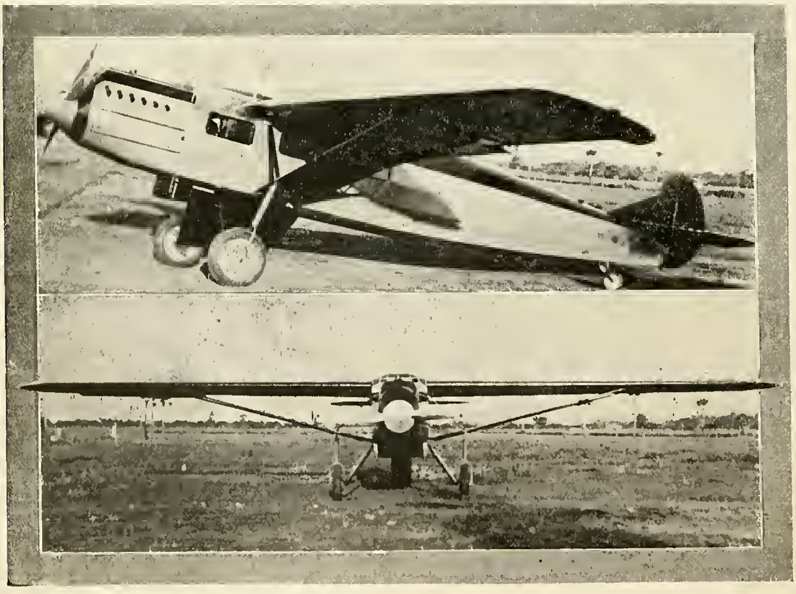
The landing gear is of the split axle type, with a special streamline covering. Landing shocks are minimized by oleo shock absorber fittings. The landing gear has a tread of 8 feet 9 inches. The wheels are equipped with brakes. A hydraulic tail wheel is used in preference to a tail skid.

Rudder is balanced. Dual Dep controls are provided and are operated by means of a combination of cables and push rods.

Instruments include air speed indicator, compass, tachometer, oil and gas pressure gauges, and temperature indicator.

Specifications

Length overall	38 feet 3 inches
Height overall	9 feet 6 inches
Span	54 feet 6 inches
Chord (mean)	6 feet 9 inches
Wing area	328 square feet
Aileron area	24 square feet
Stabilizer area	32 square feet
Elevator area	20 square feet
Rudder area	11½ square feet
Fin area	6¼ square feet
Wing strut area (lifting section)	44 sq. ft.
Weight empty	3,000 pounds
Useful load	2,500 pounds
Pay load	1,330 pounds
Gross weight loaded	5,500 pounds
Fuel capacity	160 gallons
Oil capacity	10 gallons
High speed	145 miles per hour
Cruising speed	120 miles per hour
Landing speed	55 miles per hour
Stalling speed	60 miles per hour
Climb (sea level)	1,250 feet per minute
Service ceiling	15,000 feet
Range	750 miles

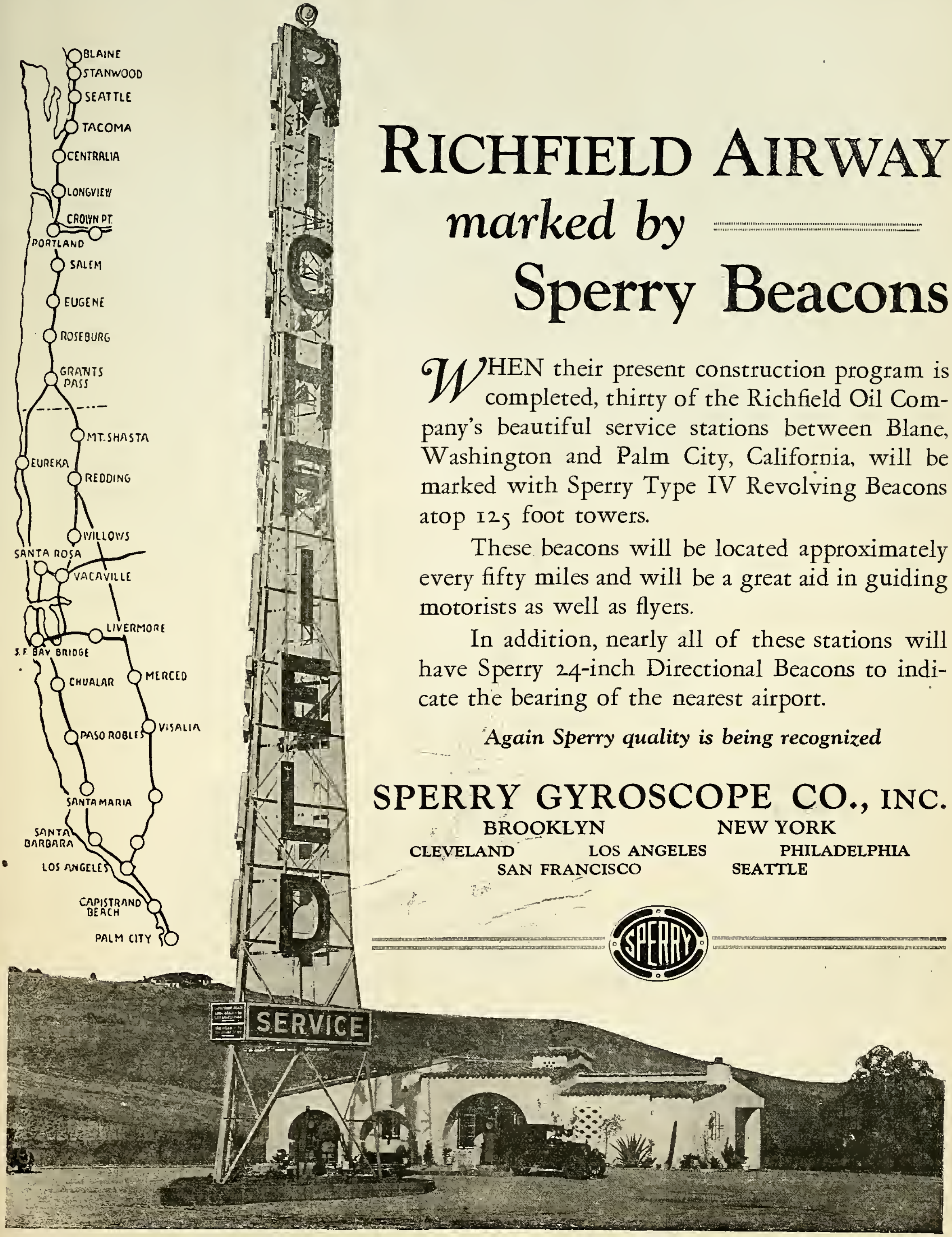


A Florida-built airliner, the McMullen Aircraft Company's passenger monoplane.

CABIN INSULATOR

RUBBER Foam is a lightweight rubber product made in sheet form for the shock-absorbing, sound-deadening, and insulation of passenger airplanes by the C/M Company of America. This material is a sound-deadener which occupies a minimum space. One layer of ⅜-inch thickness is all that is required to deaden the exhaust and lessen vibration on a trimotor transport. A sheet of Rubber Foam 36 inches by 90 inches, ⅜-inch thick weighs 4 pounds.

This insulating material is used in the construction of the Keystone Patrician, the 20-passenger transport of the Keystone Air-



RICHFIELD AIRWAY
marked by
Sperry Beacons

WHEN their present construction program is completed, thirty of the Richfield Oil Company's beautiful service stations between Blane, Washington and Palm City, California, will be marked with Sperry Type IV Revolving Beacons atop 125 foot towers.

These beacons will be located approximately every fifty miles and will be a great aid in guiding motorists as well as flyers.

In addition, nearly all of these stations will have Sperry 24-inch Directional Beacons to indicate the bearing of the nearest airport.

Again Sperry quality is being recognized

SPERRY GYROSCOPE CO., INC.

BROOKLYN NEW YORK
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SPERRY

PERFECT SEALING

Thompson Valves are "born" in an inferno of ingenious heat treatments and therefore resist warping, scaling and pitting by nature.

As a result, they keep the rapid-fire explosions of your motor perfectly sealed in the combustion chambers where the *work must* be done.

THOMPSON PRODUCTS, INC.
General Offices: Cleveland, Ohio, U. S. A.
Factories: Cleveland and Detroit

Thompson Valves

Original Equipment in 95% of American Built Aero Motors

Light-weight **MICARTA** Propellers increase payloads

THE weight of the material employed in airplanes, especially in those used in commercial activities, has much to do with profitable operation. Micarta, for instance, has but half the density of the lightest metals used for such purposes, and when used in propellers, pulleys and hinge bearings, reduces the dead weight of the planes by a margin that helps to increase the profits of the venture.

Moreover, propellers made of Micarta do not claim preference on weight alone. Other advantages are strength, freedom from vibration, accuracy of profile, efficiency, quietness, long life. Then, additional consideration should be given to the fact that Micarta propellers have adjustable pitch-setting whereby the pitch may be changed to suit flying conditions. Micarta propellers are not affected by moisture, salt-water spray or oil, and will not warp or splinter.

Complete information will be furnished by our nearest office.

WESTINGHOUSE ELECTRIC & MFG. COMPANY
EAST PITTSBURGH PENNSYLVANIA
SALES OFFICES AND SERVICE SHOPS IN ALL PRINCIPAL CITIES OF THE UNITED STATES

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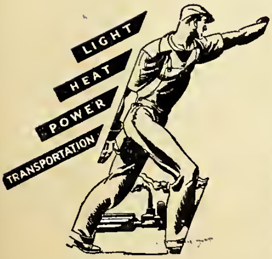


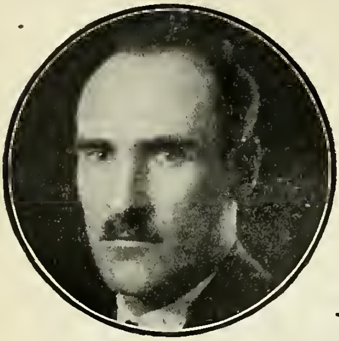
Westinghouse

Aircraft Accessories

- Micarta Propellers
- Micarta Control-wire Pulleys
- Micarta Fairleads
- Micarta Hinges
- Micarta Plate for Cabin Finishing
- Micarta Tail Skid Wheels

Airport Lighting Equipment

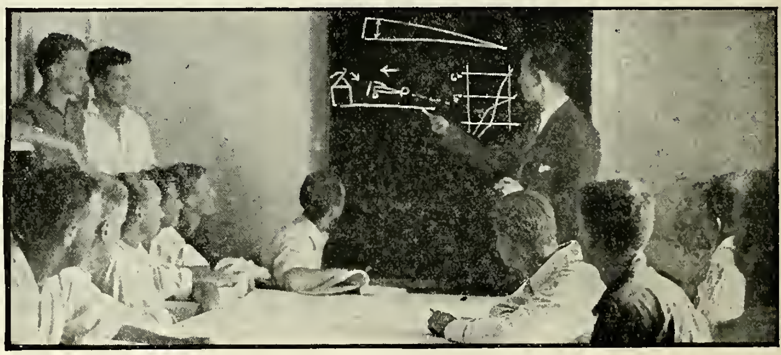
- Chromilite Landing Field Floodlights
- Boundary, Approach and Obstruction Lights
- Hangar Lights
- Reflectors
- Transformers and Motor-Generators



CASEY JONES . . . President of Curtiss Flying Service. For many years one of America's foremost pilots.

Here's the

Read it . . . before you



In this advertisement we tell you what to expect from Curtiss Training

DO you want to learn to fly? Well then, let's talk it over. Perhaps we can give you some helpful pointers from our twenty years of experience here at Curtiss.

In the first place . . . don't go off half cocked. Your first decision is by all odds the most important.

For you've got to pick a good flying school in order to become a good pilot. Any one can learn to fly . . . only a few schools can teach you to fly *well*.

And good pilots . . . the kind aviation needs today . . . have to be *made*. They aren't just born.

We hold that thought in mind always, here at Curtiss. Our whole course is laid out with that one idea . . . to take raw material and turn out *good* pilots.

We began a long time ago. Very carefully picked out the best men we could find to be our instructors. Men of long experience in aviation.

Then we trained them to instruct students. Sent them all to a special instructors' school in Detroit. Taught them how to teach . . . how to make the fine points clear and simple to you.

We set out to parallel Army and Navy training . . . but planned it to make it practical for you in time required and in cost.

What's the result? A method that is entirely Curtiss. A method that would be impossible without the years of experience massed in this organization.

When you go up in Curtiss instruction planes you learn to fly . . . not just to push and pull on the controls.

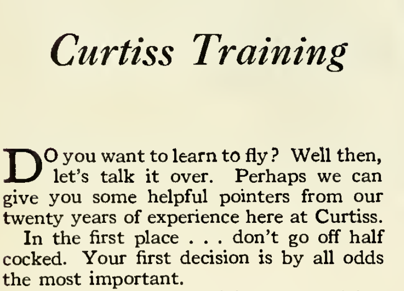
While you are in training you meet and learn to know the men who are conducting a nation-wide business-of-the-air . . . not just a single flyer or the limited personnel of a local flying field.

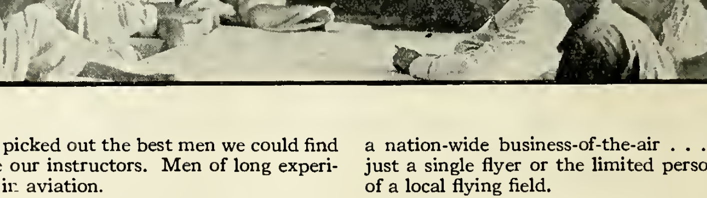
And when you graduate you are a competent flyer . . . acknowledged wherever you go . . . at home on any field . . . not just one of the thousands who can get a ship off the ground and back again.

That's why Curtiss-trained pilots are in demand everywhere. Why the 1500 pilots Curtiss has turned out include the leaders in every branch of aviation.

And remember this . . . Curtiss has 40 flying schools in active operation today. All are standard and identical in their training. All are conveniently located, in the aviation centers of their districts.

If you want more complete information about them . . . more details of how Curtiss goes about making good pilots . . . fill out the coupon now.



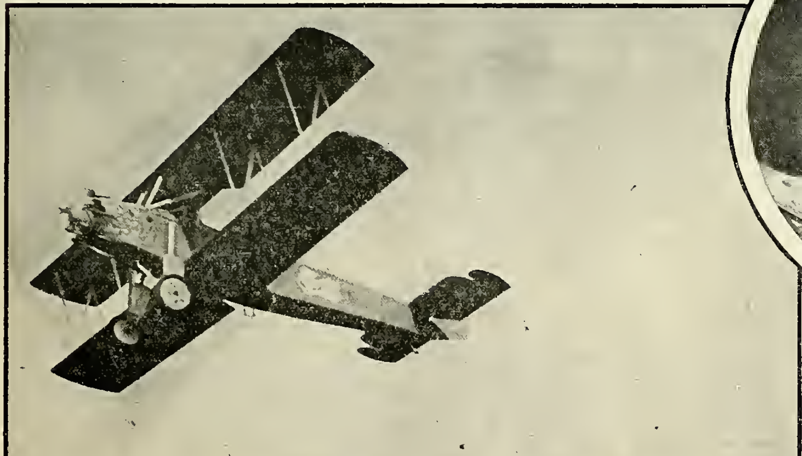


ROAR-R-R-R . . . the steady drone of motors rarely dies at a Curtiss flying school. Engines warming up . . . ships in and out . . . flying all the time. ABOVE—Picture shows the modern new Curtiss Hangar at Louisville, Ky.

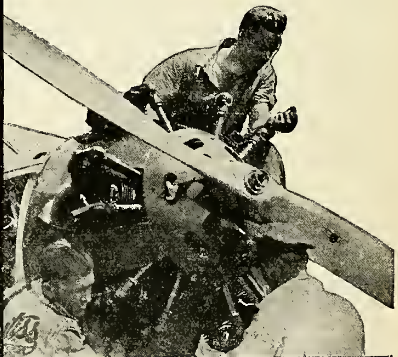
CURTISS

whole CURTISS STORY

pick a flying school



SOLO! No college commencement has a thrill like this! Photo shows Curtiss students watching member of their "class" make his first solo flight. No lack of confidence here . . . early training is too thorough . . . and better equipment isn't made. Above—Note instructor and student testing head phone used at every Curtiss school to aid instruction in the air.



CURTISS FLYING SERVICE
27 West 57th Street, New York City

Gentlemen:

Please send me complete information about the Curtiss flying schools, their locations and an outline of the courses taught.

*Name*____________________

*Address*____________________

*City*__________ *State*__________

FLYING SERVICE

"World's Oldest Flying Organization"

THE AIR SERVICES

CAPT. HOYT'S FLIGHT TO NOME, ALASKA

FLYING a Curtiss Hawk, Capt. Ross G. Hoyt left Mitchel Field, Long Island, N. Y., for an attempt to make a round trip flight to Nome, Alaska, and return in three days. Hampered by head winds and poor visibility all the way, he was forced down near Valemount, B. C., by water in the fuel after having covered 6,000 miles of the 8,500-mile flight. Although Capt. Hoyt was uninjured, the plane was damaged in the forced landing, and the flight was abandoned.

Capt. Hoyt's flight was made to test the stamina of the Army planes. The plans called for four refueling stops each way, at Minneapolis, Edmonton, Whitehorse, and Fairbanks, with a stop of from four to six hours at Nome for sleep. Averaging 140 miles per hour, the distance for the return trip would have been covered in 72 hours. On the way up, Capt. Hoyt kept up to schedule until he entered Canada, where he found adverse winds and rain storms which made him lose 12 hours. The remainder of the flight until he was forced down was made under the most unfavorable conditions.

THE War Department has ordered the development of light-weight camping equipment for the army Air Corps which can be transported by air, and which will make the air units independent of ground installations while in the field. The need of this equipment developed in the recent Air Corps concentration.

The Secretary of War has directed the Chief of Air Corps, Major General James E. Fechet, to initiate a study with a view to the developing of such equipment, including light-weight sleeping bags, light camping stoves using gasoline as fuel, and a method of enclosing the lower wings of airplanes to provide overnight sleeping quarters in the field in lieu of tents. General Fechet is also directed to include in his study any other items which he may consider necessary. Such equipment as may be developed as a result of this study will be given a practical test with at least one unit of the Air Corps in the 1930 Air Corps Maneuvers.

ORDERS for several bomb sights, said to be capable of dropping 100-pound bombs down the funnels of battleships, have been made by the War Department from a Connecticut clock manufacturing company. The device will be made at a cost of $28,000. The instrument which works out the mathematical data for a correct hit is described as being "as intricate as a chain of Swiss watches."

Recent tests have shown the instrument to be remarkably accurate in its aim, according to Army experts. It is a bomb sight which when carried on an airplane, takes into account the movement of both the airplane and the warship, including the ground speed, drift and air pockets. Its successful use, they believe, would make a 100-pound bomb as effective a destroyer of a battleship as a two-ton bomb dropped on the deck from a bomber, since the smaller bomb falling down the smokestack would explode in the most vital part of the ship. The device would enable smaller and handier planes to dispose of battleships as effectively as great bombers, which are harder to maneuver because of their size and the weight of two-ton bombs.

CLARENCE H. WALLING, chief machinist's mate in the aircraft squadrons of the battle fleet, was commended recently by Secretary of the Navy Charles Francis Adams for his work in devising a towing gear system for the use of the naval aircraft squadrons. The commendation reads as follows:

"Reports from the commander, aircraft squadrons, state that when towing operations were started in Squadron VJ-One-B a towing plane handled but one target and paid out on 7,000 feet of wire. After completion of firing, the plane was obliged to return to the base and cut the wire in order to drop the target and make a landing. It required four men to wind the wire in by hand. On these slow and inefficient methods, you made successive improvements, until you finally developed the present double towing system whereby the used sleeve may be slipped by an operator in the plane and the wire reeled in by the pull of the new sleeve being paid out on the opposite side. A skillful crew can stream a new target in three or four minutes and as many targets can be streamed in a single flight as the capacity of the plane permits carrying.

"During the last towing operations conducted by the U. S. S. *Aroostook* for battleships off San Pedro a PN-12 plane in one flight remained on station about seven hours during which period three battleships fired an anti-aircraft practice. Eleven of the 12 targets carried were used.

"The Department takes pleasure in commending you for the inventive ingenuity you have displayed. Your success has resulted in great benefit to the service at large."

Capt. Ross G. Hoyt and the Curtiss Hawk he flew to Nome, Alaska

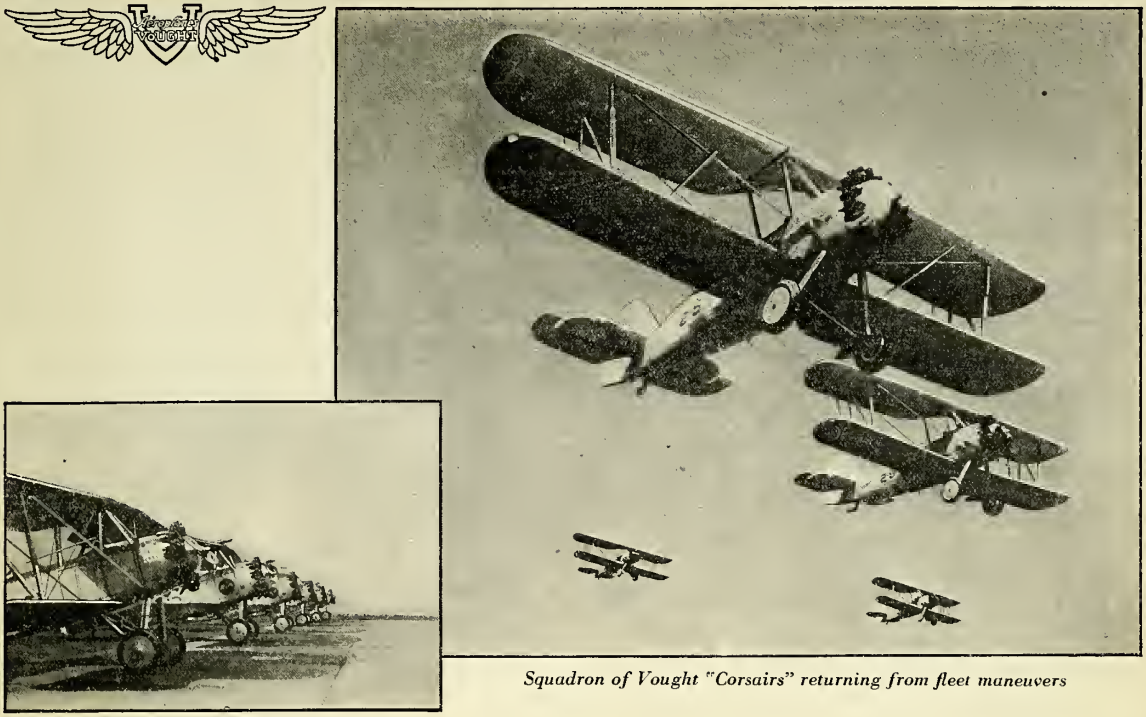
MINNEAPOLIS RESERVE CAMP

THIS summer the War Department established the first training camp for Air Corps Reserve Officers in the vicinity of Minneapolis, Minn. The camp is being held at the Wold-Chamberlain Flying Field, and is being conducted by Regular Army officers with regular Air Corps equipment. In use at the camp are nine PT-1 airplanes, the regular army primary training type used in the Flying Schools at Brooks and March fields. These planes were brought to Minneapolis for the training period from Richards Field, Kansas City, Mo., and Marshall Field, Fort Riley, Kansas. The training at the camp consists of check flights to ascertain the ability of Reserve Officers to handle the airplane by themselves. Those requiring additional instruction are given it by the Regular officers, and it is planned to have everyone solo before the camp is over.

As soon as an officer has soloed and had some practice, he is given training in aerobatics. landings, cross-country flying, formation flying and the performance of minor tactical missions, such as coöperation with ground troops, military sketching from the air, and location of targets. The officers are quartered on the Fort Snelling Reservation, but their entire training activities are at the flying field, where the day starts for them at 7:15 in the morning, flying being continued until noon. The first period in the afternoon consists of lectures on Air Corps subjects by the Regular officers, followed by athletics for all.

Minneapolis is to be congratulated on this first training camp and it is pretty sure to have these camps every year with larger

(*Continued on next page*)



Squadron of Vought "Corsairs" returning from fleet maneuvers

For that unbeatable combination of speed, brilliant performance and perfect control

—Vought "Corsairs" are known the world over.

Sound design, rugged construction and all-around trustworthiness, have enabled "Corsairs" to meet, over a long period, the varied and strenuous needs of the U. S. Naval Air Service.

Powered with the dependable Wasp engine, the "Corsair" is unapproached for its rapid climb, and its agility in getting in and out of small fields with heavy loads. It is plain, therefore, that the "Corsair" has set up a new, high standard of performance, not only for military purposes, but for commercial and private use.

CHANCE VOUGHT CORPORATION

DIVISION OF UNITED AIRCRAFT & TRANSPORT CORP.

Long Island City, New York

(*Continued from preceding page*)

attendance and greater participation by Army aircraft. The Army contemplates placing a hangar and equipping the Reserves with Army airplanes, and as soon as this is done the Wold-Chamberlain Airport will then be designated as an Army Reserve Airport, which will give it a definite military status.

FLYING from France Field, Canal Zone, to Kelly Field, Texas, in 21 hours and 20 minutes is the latest achievement of Lieuts. W. T. Larson and L. J. Carr, who are regularly stationed at Kelly Field. These two officers, flying a standard A-3 attack plane equipped with auxiliary fuel tanks, took off from France Field at 3:30 a.m., July 11th, and arrived at their home station at 11:50 p.m.

They stopped en route at Managua, Nicaragua; Minititlin, Mexico; and Brownsville, Texas. Deducting time consumed during their three stops for the purpose of servicing their plane (one hour and thirty-five minutes), their actual flying time was 19 hours and 45 minutes, an average speed of 107 miles per hour for the 2,100-mile trip.

BOMBERS DESTROY TANK STEAMER

SIX Keystone bombers from Langley Field recently destroyed the stranded Greek tank steamer, *Paraguay*, off Kitty Hawk, North Carolina, in bombing practice. Each of the planes carried two 100-pound bombs, one 300-pound and one 600-pound. The bombs were dropped from an altitude of 3,000 feet.

Two bombs made direct hits, falling on the exposed deck of the tanker. Five others made partial hits, striking either on the side or on the after section of the vessel. The remainder fell in the water within fifty feet of the *Paraguay*.

The direct hits blew the wrecked vessel into small bits, steel and iron having been thrown into the air for almost 100 feet. Particles of the debris fell on the shore at Kitty Hawk. Major Hugh Kerr, who commanded the bombers, said the bombs that fell in the water were counted as hits because they would have done as much damage to a live target as if they had hit it. He said these bombs blew in the port side of the tanker which was exposed to the ocean side, and had the vessel been that of an enemy, it would have been completely disabled.

ENLARGED QUARTERS AT FRANCE FIELD

A TOTAL of $25,000,000 will be spent on the Army housing program for the Canal Zone, according to a statement made recently by Representative W. Frank James of Michigan, a member of the Military Affairs Committee, who is now on a tour of inspection of practically all the Army posts in the United States and its territories. The housing plan involves $3,000,000 additional for quarters for the air station at France Field and the same amount for a new station being constructed on the Pacific at Allbrook Field.

Mr. James plans to make practically all of the tour by airplane with Captain J. R. Dinger as pilot. "I believe the Canal Zone, Hawaii and the Philippines should have air forces on practically a war basis, even in time of peace," he said, explaining the impracticability of moving planes from the United States to those posts in time of need. He requested Major Gen. Malin Craig, commanding the Canal Department, to prepare data indicating the needs for war-time air defense of the Canal and will make an effort to see they are provided for.

GROUND was broken recently for two new barracks at Mitchel Field, L. I., to cost $274,000. They are to be constructed of steel and reinforced concrete. One will house 163 men and the other 132.

Mitchel Field is to have eleven other buildings in the current fiscal year. The buildings are being erected under direction of Capt. Clarence Greene, construction quartermaster.

THE largest Army airport and aviation school in the world is being constructed at Randolph Field, near San Antonio, Texas. The first appropriation of $7,531,000 recently made by Congress for the field are being used in the development of roads. A total expenditure of $14,000,000 has been allowed by the Government on the field, which, when completed, will represent an investment of $50,000,000.

Randolph Field will be a city of 5,000 Army men and their families, housed in homes of Spanish architecture. They are to have recreation facilities and a modern school for their children. The hangars which will stretch along a two-mile line on the field, will enable 250 planes to take off simultaneously. The facilities of Brooks Field are to be moved over, as are some of the units of March Field in California. The weather at Randolph Field permits flying during 80 per cent of the year.

ORDERS for $50,000 worth of airplane pontoons were received recently by the Great Lakes Aircraft Corporation of Cleveland from the United States Navy.

Major Lyon to France Field

MAJOR EDWIN B. LYON, Air Corps, who until lately was in charge of the School Section, Training and Operations Division, Office of the Chief of the Air Corps, Washington, recently arrived at France Field, Panama Canal Zone, and assumed command of the 6th Composite Group and France Field, and also took over the duties of Department Air Officer.

Arriving in the Canal Zone at the same time were 1st Lieuts. Edmund C. Lynch, John M. Davies and Louis N. Eller. Lieut. Lynch was assigned to the 7th Observation Squadron, Lieut. Davies to the 25th Bombardment Squadron and Lieut. Eller to the 24th Pursuit Squadron.

Selfridge Field Tactical Inspection

GENERAL PARKER, Commanding General of the Sixth Corps Area, made his tactical inspection of Selfridge Field, Mt. Clemens, Mich., on June 26th. General Parker was accompanied on his inspection by Lieut. Colonel Riley, Majors Ditto and Wildrick.

Following his inspection of the planes on the line, an aerial review was staged, which was participated in by 25 planes of the First Pursuit Group and five planes of the 15th Observation Squadron. Colonel Danforth led the review in his P-1C, followed by the 15th Observation Squadron, commanded by Captain Reynolds, and the Pursuit Group commanded by Major Royce. Following the actual review, the planes maneuvered for about half an hour before the general, after which he proceeded with the inspection of the barracks. At noon, luncheon for all the officers and visitors was served at the Officers' Club, and the General spent the afternoon visiting the various departments of the field.

Selfridge Personnel Participates in Airport Dedications

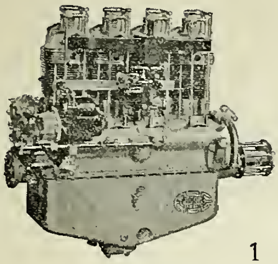
SINCE the return of the First Pursuit Group, Selfridge Field, Mt. Clemens, Mich., from the Air Corps Maneuvers in Ohio, personnel from that organization participated in no less than 12 airport dedications.

Six P-1's and three Observation planes were flown to Sioux City, Iowa, for the purpose of participating in the dedication of the Rickenbacker Airport at that point. The same planes were then flown to Rochester, Minnesota, where the pilots assisted in dedicating the Mayo Clinic Airport. While there, all the members of the flight were entertained and were afforded an opportunity to visit the clinic.

On the return of the flight from Rochester, Major Royce left the formation at Chanute Field, Rantoul, Ill., and proceeded to Memphis, Tenn., to attend the opening of the new Memphis Field. Three planes were flown from Selfridge Field to Moline, Illinois, to assist in the election to put over a municipal bond issue for the purpose of providing a municipal flying field.

Three planes were also flown to Bradford, Penna., to assist in the opening of an airport at that locality.

A VISIT to assist in the opening of the new municipal airport at Kingston, Ontario, Canada, was made by members of the First Pursuit Group, Selfridge Field, Mich. A flight of three P-1's, piloted by Major Royce, Lieuts. Robinson and Warren, left on the afternoon of June 3rd and returned on the 5th. At Kingston the three officers were entertained by General Anderson, in command of the military district, and his staff; the members of the artillery garrison at that point and the officers on duty at the Royal Military College, as well as by the Mayor, the American Consul and the officials of the Kingston Flying Club.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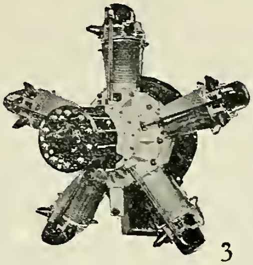
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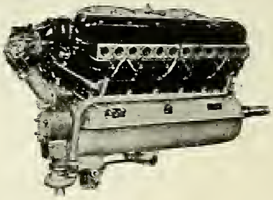
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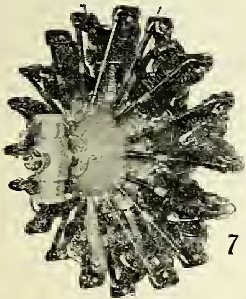
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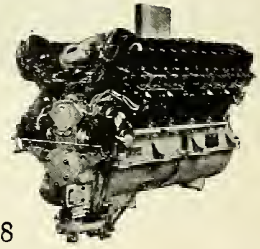
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THEIR RECORDS ARE OUR RECORDS!

U. S. COMPRESSION and Oil Control Piston Rings are standard equipment in the outstanding aviation engines pictured on this page, among others. We are proud of our contribution to their achievements:

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2. Bliss Jupiter-9.
3. Bliss Titan-5.
4. Curtiss Challenger-6.
5. Pratt & Whitney Wasp-9.
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12. Wright Whirlwind-9.

The above firms use over 90 per cent of all aviation piston rings used in this country.

For the following firms, we are now either conducting or preparing tests for their aviation engines: Aeromarine RAD-9, Salmson AD-9 and BUL; Allison Engineering Company; Bristol Airplane Company, Ltd.; Century Rotary Motor Company; Chevrolet Aircraft Corp.; Fairchild-Caminez Engine Company; Fiat; Fisher & Jacobs, Inc.; Kinner Aeroplane & Motor Corp.; Lycoming Mfg. Company; Warner Aircraft Corp.

U. S. HAMMERED PISTON RING CO.
PATERSON, N. J.

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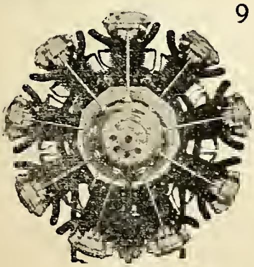
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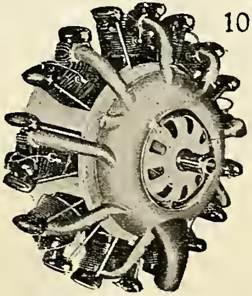
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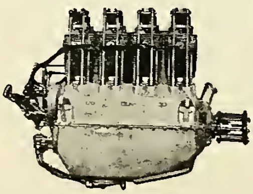
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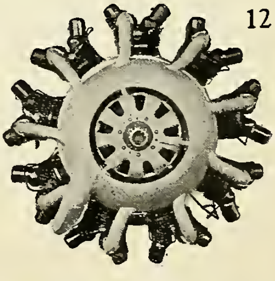
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Fleet of 8 Aristocrats built by the General Airplanes Corporation now on the Greatest Air Tour ever undertaken. These standard 3-Place Cabin Monoplanes were bought by the General Tire & Rubber Company for a 50,000 Mile Air Tour of the United States, Canada, Mexico and Cuba to promote the sale of its products.

Aristocrats Making Aviation History

After more than a month of unusually hard service, during which more than 1300 flights were made, eight Aristocrat Airplanes purchased by the General Tire and Rubber Company are triumphantly proceeding on the Greatest Air Tour ever undertaken. They will travel approximately 50,000 miles through the United States, Canada, Mexico and Cuba.

Safe Dependable Airplanes For Commercial Service

At every stop, distributors, dealers and customers of the General Tire and Rubber Company are given "Sky Rides." Landing and taking off repeatedly on small, rough fields, "hopping" one load of passengers after another in the most grueling kind of service, these eight Aristocrats are daily adding further proof of their safety, dependability and ease of handling.

The cost of operation and maintenance is surprisingly low.

Write for complete information concerning "The Aristocrat of the Air." In design, construction and performance it is all that the name implies.

Some excellent territory still open for desirable dealers.

GENERAL AIRPLANES CORPORATION, *Buffalo, N. Y.*

WESTERN NEWS

WESTERN STATES AIR CONFERENCE FORMULATES PROGRAM

By Glen Perrins

THE formation of a permanent organization for the promotion and protection of aviation was urged by Governor H. C. Baldridge of Idaho in welcoming several hundred delegates to the Western States Air Commerce and Airways Conference July 8, 9 and 10.

Uniform air legislation is one of the chief needs of the nation, the governors of eleven western states learned from Colonel Harry H. Blee, Chief of the Division of Airports and Aeronautics Information of the Department of Commerce.

Predicting that there would be more than 100,000 planes operating in this country by 1934, Governor George H. Dern of Utah stated there is an immediate need for formulating an aeronautical code. He predicted the time when the United States would help finance airports.

A. O. Preil, of the Department of Commerce, Airways Division, stationed at Salt Lake, spoke on safe flying and day and night radio communications regarding weather forecasts. P. G. Johnson, president of the Boeing System, also spoke. Major B. B. Claggett, of San Francisco, representing the Army, and Lieut.-Commander E. W. Spencer, of San Diego naval air station spoke. Governor Frank C. Emerson, of Wyoming, stressed the value of well-equipped airways in serving the Army and Navy in national defense.

At the closing session, Governor Baldridge asked that the western states organize to keep aviation free of too much throttling legislation. He declares that the states should organize themselves to settle these matters "without having to carry everything clear back to Congress. I dread the prospect of aviation coming under the jurisdiction of the Interstate Commerce Commission."

Edison E. Moulton of San Francisco, district aeronautical supervisor for the Department of Commerce, said there are four main elements that go toward making aviation safe. The first is airworthy aircraft; the second, competent pilots; the third, adequate landing facilities, and the fourth, air information.

An appeal to the states to forego taxing aeronautical interests until they were well established was made by C. W. H. Smith, of Salt Lake, representing Western Air Express. In reply, C. C. Thompson, of Boise, governor of the National Aeronautic Association for Idaho, declared that aviation will surely be required to bear its share of the burden as it began to take business away from the railroads, which, he said, are now bearing heavy burdens. Mrs. Mabel Walker Willebrandt spoke at the banquet.

The matter of airway marking and town designation was taken up at length at the convention, with delegates favoring towns painting names on broad roofs.

Dr. L. I. Hewes, of the bureau of public roads, predicted rapid development of airplane tourist travel in the West. Earl B. Wadsworth, of the Post Office Department, warned that no more cities would be included in mail routes unless they have adequate airports and were located on prepared air routes.

After a meeting at which plans for a permanent organization were presented to the assembly for possible ratification, the meeting closed. The session ended early to permit the general committee to draft the general form of the organization.

CONTACTS

[By F. E. Samuels]

FROM an Aeronautical standpoint Los Angeles and its immediate neighborhood has been an unusually busy center of activities for the past thirty days. New airlines have been opened, the runs of the older established ones extended, and feeder lines have been established by the different air transportation companies. The local airports and flying fields have contributed with an unprecedented number of students soloed and passengers flown. The manufacturers of airplanes and engines have been operating their plants on a twenty-four-hour schedule trying to establish new production records, and new factory plants are being built all around us. Western pilots have also been breaking records with great zest.

THE opening of the Transcontinental Air Transport line was the occasion of a great public demonstration at the Grand Central Air Terminal, Glendale, when Col. Charles A. Lindbergh piloted the first plane of the western division of the line to Clovis, N. M., returning on July 9, from Clovis, with the first passengers from the East.

ANOTHER new air route is the Standard Airlines' daily Los Angeles-Big Bear service, operating Fokker Super-Universals from the Aero Corporation of California airport on Western Avenue. This should be a very popular trip, and one every passenger will enjoy, for it is the most beautiful trip, I believe, not only of the West, but of the entire country. Leaving the airport, the planes make a gradual climb, until on reaching San Bernardino an altitude of ten thousand feet has been attained. Three thousand feet more are gained before the summit is reached. From that altitude the desert on one side and the ocean on the other are plainly visible, with the rugged mountain peaks directly under the plane. The route passes Arrowhead, Little Bear and Big Bear Lakes. Then after a long circle over Big Bear Valley, the plane drops down onto a perfect landing field in the heart of the mountains, at an altitude of nearly eight thousand feet, fifty-five minutes away from Los Angeles.

THE Nevada Air Express, operating daily between Los Angeles and Reno, Nevada, is another of our new airlines. This line operates from the Grand Central Air Terminal, with an equipment of Lockheed Vega planes. This route also affords unusual scenic splendors. Rosco Turner, who is in charge of operations, says, "it is the fastest airline in the world." Little Jack O'Brien is with the company and is keeping up his reputation of being one of our best pilots.

THE Western Air Express, operating from its Telegraph Road airport, with beautifully equipped trimotored Fokkers, started operations before the thirty-day period mentioned in our opening paragraph, but its successful daily run between Los Angeles and Kansas City, Mo., entitles it to the credit of being the first air-rail line between the East and the West. As a pioneer of the West, this company started the first air mail Douglas plane, from the same airport, on the Los Angeles-Salt Lake run, over three years ago.

THE extension of established air routes involves the Pickwick Air Lines, operating Bach air transports. This company has extended its lines to cover the entire West Coast, from Canada to Mexico.

THE Maddux Air Lines have made arrangements by which they connect with the Transcontinental Air Transport at Los Angeles, flying the passengers for San Francisco over their line and completing an air-rail route from New York to San Francisco.

(Continued on next page)

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The ideal flying conditions peculiar to Southern California ◆ as proven by United States Government Weather Bureau reports over a period of 50 years ◆ are priceless *(yet costless)* to the aircraft manufacturer who locates his plant in . . . . . .

On an average, Los Angeles County has 355 days of sunshine a year, and only 16 days during the year when one-quarter of an inch or more of rain falls.

* * *

Average velocity of wind, 5 miles per hour. Average, 5 days a year when wind reaches velocity of 25 miles or more per hour.

* * *

There are approximately 1000 licensed and identified aeroplanes in California, practically as many as in the states of New York and Illinois combined, and 75% of these are in Southern California.

* * *

There are 55 air ports and landing fields; 17 aeroplane factories; 9 air craft motor factories; 4 air-rail terminals and 2 air mail terminals in Los Angeles County; and more licensed pilots than in any other county in the United States.

* * *

Because of the concentration of air craft industry here, highly experienced, skilled labor is plentiful. Approximately 2200 registered students are now taking flying training in Southern California.

* * *

Air-Minded
LOS ANGELES COUNTY

Complete detailed surveys and information supplied upon request to INDUSTRIAL DEPT., LOS ANGELES CHAMBER OF COMMERCE.

(*Continued from preceding page*)

AMONG the new plants for the manufacture of airplanes, engines and accessories, either nearly or completely finished, is the great Emsco aircraft factory at Downey, a suburb of Los Angeles, which now houses the building of the Emsco airplanes. The entire factory force has moved into the new factory from the small plant at Long Beach. The latest machinery has been installed, metal jigs for all parts of the plane are in place, and a large force of employees has been taken on to rush production. The first plane has made a number of long trial trips and has proved to be a great performer, both for speed and for its load capacity.

THE new fireproof factory building of the Moreland Aircraft, Inc., adjoining the Los Angeles municipal airport (Mines Field), is also completed and the company starts on a production basis at once. The machinery installed is the best procurable. Complete material for the first ten ships has been delivered at the plant, executives for the different departments have been engaged, and a full force of mechanics has been employed.

THE Commercial Aircraft Company held its opening ceremonies and a big dance at its new steel and cement factory building, situated at the Los Angeles Metropolitan Airport, on July 6th. The factory is the last word in its efficient layout. Production of the Sunbeam cabin plane starts at once.

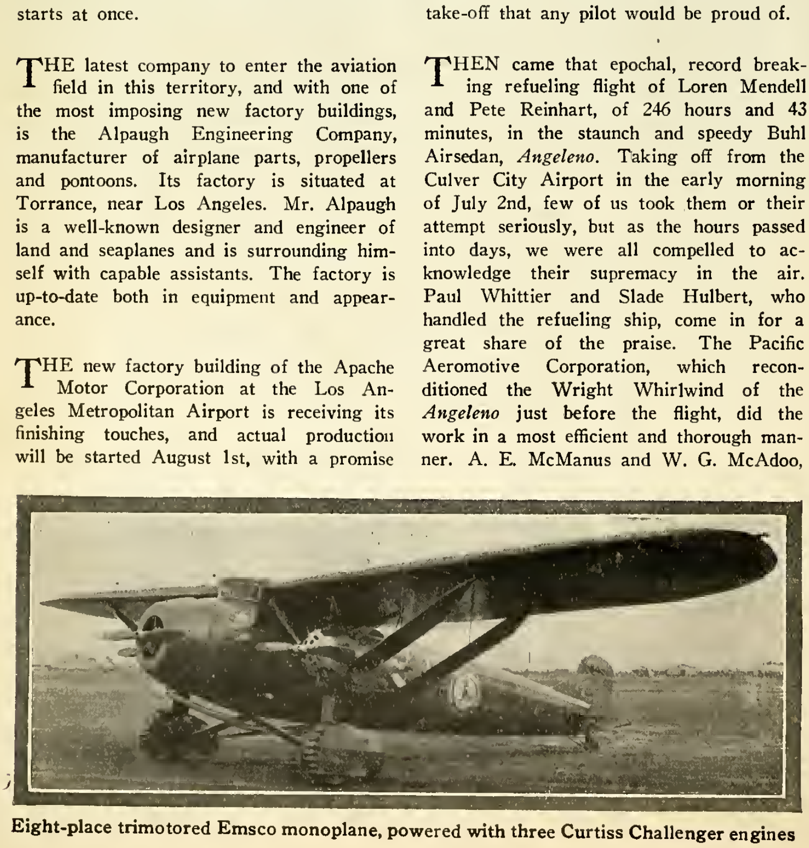
THE latest company to enter the aviation field in this territory, and with one of the most imposing new factory buildings, is the Alpaugh Engineering Company, manufacturer of airplane parts, propellers and pontoons. Its factory is situated at Torrance, near Los Angeles. Mr. Alpaugh is a well-known designer and engineer of land and seaplanes and is surrounding himself with capable assistants. The factory is up-to-date both in equipment and appearance.

THE new factory building of the Apache Motor Corporation at the Los Angeles Metropolitan Airport is receiving its finishing touches, and actual production will be started August 1st, with a promise that within sixty days from that date Apache engines will be turned out at the rate of six per day. Two types of radial aircraft engines will be featured—the Apache Warrior 225 horsepower and the Apache Chief of 330 horsepower.

LIKE Phoenix rising from the ashes is the assembly building of the Bach Aircraft Corporation. Before the ashes of the recent fire were cool, the ruins were being cleared away and plans made for a larger and better equipped building. The original production basis, of one a week, has not been interfered with to any great extent, although the added amount of work being done in the main unit of the plant causes crowded conditions.

THE after-dark arrival of Capt. Frank Hawks on his record breaking nonstop flight and his take-off for his return flight to New York, after three o'clock in the morning, created more excitement and caused more anxiety than any event we had ever had up to that time. Long before he was due to arrive, a crowd had gathered at the Metropolitan Airport. Just after dark the hum of his motor was heard. A few seconds later he dropped down into sight and made a perfect landing. His father rescued him from the crowd, and after a light lunch, rushed him to a shower bath and bed. It was after 3 a. m. before the fuel tanks were filled and the mechanics pronounced the engine fit for another race against time. A light breakfast and then a take-off that any pilot would be proud of.

THEN came that epochal, record breaking refueling flight of Loren Mendell and Pete Reinhart, of 246 hours and 43 minutes, in the staunch and speedy Buhl Airsedan, *Angeleno*. Taking off from the Culver City Airport in the early morning of July 2nd, few of us took them or their attempt seriously, but as the hours passed into days, we were all compelled to acknowledge their supremacy in the air. Paul Whittier and Slade Hulbert, who handled the refueling ship, come in for a great share of the praise. The Pacific Aeromotive Corporation, which reconditioned the Wright Whirlwind of the *Angeleno* just before the flight, did the work in a most efficient and thorough manner. A. E. McManus and W. G. McAdoo, Jr., owners and operators of the Culver City Airport and managers of the flight, were at the airport day and night making representatives of the press and all connected with the flight as comfortable as possible during their long vigil.



Eight-place trimotored Emsco monoplane, powered with three Curtiss Challenger engines

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CALIFORNIA

THE airplane factory of the Bach Aircraft Company at Van Nuys, Calif., was destroyed recently by fire. Two buildings, materials, and two completed trimotor transports were lost in the flames with a reported loss of $350,000. The blaze is said to have started in the dope department.

PRODUCTION on three types of airplanes has been begun in the new $1,000,000 plant of the Emsco Aircraft Corporation at Downey, Calif. The first trimotored Emsco Challenger is now on a tour of the United States with officials of the corporation.

The Emsco Cirrus, new type small plane, will be powered with a four-cylinder, 90 horsepower, air-cooled American Cirrus engine. It will have a high speed of approximately 145 miles an hour and a cruising speed of 110 miles an hour, the landing speed being 35 miles an hour. It will be equipped with wheel brakes, Aerol shock-absorbing struts and Consolidated instruments.

The Emsco Challenger, an eight-place cabin monoplane, powered with three 170 horsepower Curtiss Challenger engines, and the Emsco-B-2, of the same design except that it has a 60-foot wingspread and is powered with either Pratt and Whitney or Wright engines, will be exhibited at the Cleveland show. Production will be begun later on two more models, a 30-passenger plane with a 120-foot wingspread and four engines, and a bimotored amphibion.

Western Air Express Service Expanded

DOUBLE air mail and passenger service was inaugurated on July 10 between Los Angeles and San Francisco by the Western Air Express. The planes cover the run between the two cities in three hours, now making two round trips daily. Transports leave Los Angeles at 8:50 a. m. and 5 p. m., and leave San Francisco at 9:10 a. m. and 5 p. m.

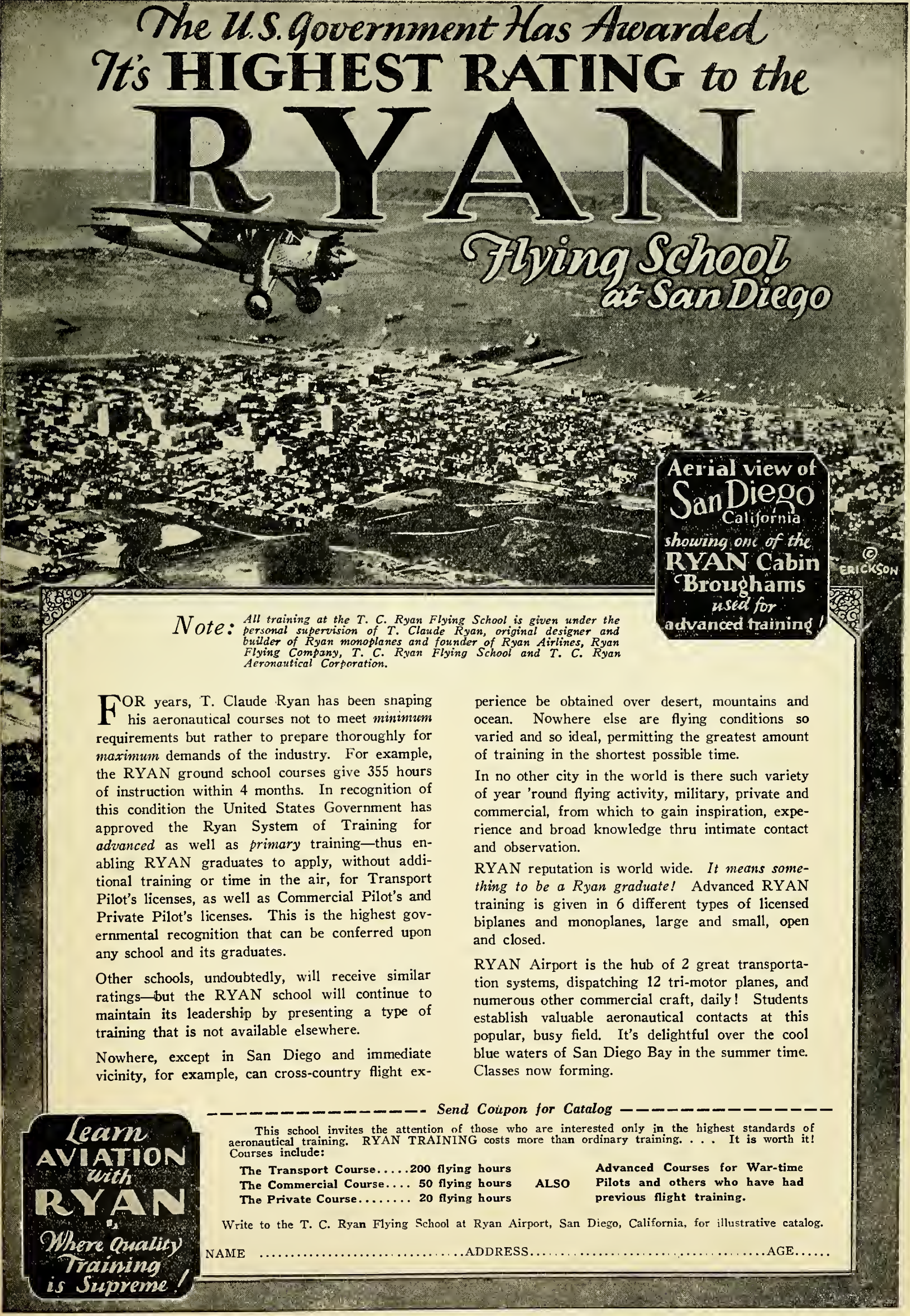
Western Air Express is also operating the Kansas City-Los Angeles route, planes leaving Los Angeles daily at 5 a. m., arriving in Kansas City at 7:30 p. m., and leaving Kansas City at 8:30 a. m. to land at Los Angeles at 9:30 p. m. The company also operates a double daily service to Salt Lake City.

Airtech School Approved

THE Airtech School of Aviation located on Lindbergh Field, in San Diego, California, was recently approved by the Department of Commerce, Aeronautics Branch, as a transport, limited commercial and private pilots' ground and flying school.

(*Continued on next page*)

The U.S. Government Has Awarded It's HIGHEST RATING to the RYAN Flying School at San Diego



Aerial view of San Diego California showing one of the RYAN Cabin Broughams used for advanced training!

Note: *All training at the T. C. Ryan Flying School is given under the personal supervision of T. Claude Ryan, original designer and builder of Ryan monoplanes and founder of Ryan Airlines, Ryan Flying Company, T. C. Ryan Flying School and T. C. Ryan Aeronautical Corporation.*

FOR years, T. Claude Ryan has been shaping his aeronautical courses not to meet *minimum* requirements but rather to prepare thoroughly for *maximum* demands of the industry. For example, the RYAN ground school courses give 355 hours of instruction within 4 months. In recognition of this condition the United States Government has approved the Ryan System of Training for *advanced* as well as *primary* training—thus enabling RYAN graduates to apply, without additional training or time in the air, for Transport Pilot's licenses, as well as Commercial Pilot's and Private Pilot's licenses. This is the highest governmental recognition that can be conferred upon any school and its graduates.

Other schools, undoubtedly, will receive similar ratings—but the RYAN school will continue to maintain its leadership by presenting a type of training that is not available elsewhere.

Nowhere, except in San Diego and immediate vicinity, for example, can cross-country flight experience be obtained over desert, mountains and ocean. Nowhere else are flying conditions so varied and so ideal, permitting the greatest amount of training in the shortest possible time.

In no other city in the world is there such variety of year 'round flying activity, military, private and commercial, from which to gain inspiration, experience and broad knowledge thru intimate contact and observation.

RYAN reputation is world wide. *It means something to be a Ryan graduate!* Advanced RYAN training is given in 6 different types of licensed biplanes and monoplanes, large and small, open and closed.

RYAN Airport is the hub of 2 great transportation systems, dispatching 12 tri-motor planes, and numerous other commercial craft, daily! Students establish valuable aeronautical contacts at this popular, busy field. It's delightful over the cool blue waters of San Diego Bay in the summer time. Classes now forming.

Learn AVIATION with RYAN

Where Quality Training is Supreme!

--------------- *Send Coupon for Catalog* ---------------

This school invites the attention of those who are interested only in the highest standards of aeronautical training. RYAN TRAINING costs more than ordinary training. . . . It is worth it!

Courses include:

The Transport Course.....200 flying hours
The Commercial Course.... 50 flying hours
The Private Course........ 20 flying hours

ALSO **Advanced Courses for War-time Pilots and others who have had previous flight training.**

Write to the T. C. Ryan Flying School at Ryan Airport, San Diego, California, for illustrative catalog.

NAME ..............................ADDRESS..............................AGE.....

(California News continued)

Exhaustive tests were made of the Airtech School of Aviation's equipment, courses and personnel by the Department of Commerce inspectors.

Lindbergh Field, San Diego's municipal airport where the Airtech School of Aviation has its headquarters, as well as the school's own 434-acre field, located on the Camp Kearny Mesa, was included in the Department of Commerce inspection. Airtech's own field was checked for facilities in training students for day and night flying. These included equipment for lighting the runways and marking the field at night. Airtech Field is free from obstructions in every direction, and is clearly marked with 3,000-foot runways 500 feet wide bisecting the field at an angle of 60 degrees.

California Air Industries Association

AT the last meeting of the Commercial Aircraft Operators Association held July 12th at Los Angeles, an enlarged plan of operation was adopted according to an announcement by Cadden Jenkins, managing secretary of the organization. The association will henceforth be known as the California Air Industries Association and will be governed by an executive committee comprised of five members. The new organization will include members of aircraft industries, among which are dealers, distributors, and manufacturers.

Through the efforts of the association the Evans bill was recently passed by the State Legislature and signed by Governor Young at the last session. This bill now offers the most advanced features pertaining to aeronautic legislation and will aid the California aircraft industry.

The executive committee of the association as elected includes: Tom Morgan, C. O. Prest, Charles Dycer, J. B. Webster, and Waldo D. Waterman.

INSPECTOR ROBERT HAZEN of the Department of Commerce recently inspected the lighting equipment at the Los Angeles Metropolitan Airport as a part of the program laid out for the official rating tests which are being conducted through the direction of Waldo D. Waterman, general manager of the port.

THE newest hangar completed by the Los Angeles Metropolitan Airport Company has been leased to Glover Ruckstell, and is in use. It is a masonry and steel structure 130 by 150 feet and contains eight offices. Mr. Ruckstell will maintain a modern machine and repair shop in conjunction with a drafting department for mechanical research and development of air meters, besides distributing several makes of planes.

Edward L. Erickson, who has conducted the Aero Brokerage Service Company at the Metropolitan Airport for the past six months, is affiliated with Mr. Ruckstell. The firm will be known under the trade name of R. E. B. Air Associates.

A RECENT report issued by Western Air Express shows that 7,880 passengers were carried on the company's lines from January 1 to July 1 of this year, as compared to 6,794 for the entire year 1928. The Los Angeles-Kansas City line, making rail connections to all parts of the country, operated at 50 per cent of capacity during June, the first month of its existence. An average of 12 persons a day were carried.

Eastbound travel was about 50 per cent greater than that originating out of Kansas City. The six trimotor Fokkers used on this line flew a total of 86,099 miles during the month. Approximately 30 per cent of the passengers carried out of Los Angeles made use of the air-rail hook-up of Western Air Express at Kansas City, giving 43-hour service to New York.

LESLIE MILLER, of Miller Airplane Products, Los Angeles, originally designed the system of rocker arm lubrication similar to those used on the engines of two of the recent endurance record planes. The system of forced lubrication like that originated by Mr. Miller assisted the Whirlwind engines of Byron K. Newcomb and Roy L. Mitchell at Cleveland, and of Loren Mendell and Pete Reinhart at Los Angeles, to set new long-time records for flight.

This system was first installed on the solo endurance plane of Bobbie Trout in February, 1929. It consists of small copper tubes leading to each rocker-arm, and connected to a larger tube which leads to the cockpit. An Alemite lubrication gun, using heavy oil, is fitted to the tube terminal. Thus the pilot can lubricate the rocker-arms while in flight by turning the handle of the gun.

AN interesting airlog has just been prepared for passengers of the Pacific Air Transport, on the Seattle-Los Angeles line, which has the time tabulated at both sides of the sheet giving the aerial passenger definite monuments and landmarks of cities to identify. Passengers report that the airlog adds much to the interest of the trip.

THE West Coast Air Transport Company of Oregon was purchased and reorganized recently by a group of business men including James A. Talbot and Harris M. Hanshue. The new organization is to be known as the West Coast Air Transport Corporation, and will furnish daily aerial passenger and freight transportation service between San Francisco, Portland and Seattle and intermediate points.

Officers of the West Coast Air Transport Corporation include, Harris M. Hanshue, president; James A. Talbot, vice president; Bradford M. Melvin, vice president; and R. W. McKee, secretary and treasurer.

NEGOTIATIONS have been completed with the Pratt and Whitney Aircraft Company whereby the Aero Corporation of California has been awarded a franchise for authorized service and parts sales on Pratt and Whitney engines in the territory including Southern California, Arizona, New Mexico and Texas.

A recent report issued by the Aero Corporation of California covering operations for the first five months of 1929 indicated an increase of 150 per cent over the first five months of 1928. Airplane sales increased 50 per cent over the same period last year while the sale of parts, supplies, gas and oil increased 70 per cent over the first five months of last year.

PLANS for the formation of foreign subsidiaries in Mexico City and the South American Republic of Chile by the Aircraft Finance Corporation of America, were recently announced by A. O. Hunsaker, president of the organization.

CENTRAL CALIFORNIA

[RUSSELL GRIGSBY]

THE College of the Pacific at Stockton has lately received an endowment fund which will enable it to improve and expand its aviation course when the fall term begins in September.

Hilton Lusk, technical instructor for the College of Pacific has resigned to join the Boeing company. Mr. Harnes of Pasadena California Technical School has been appointed technical instructor to fill the vacancy.

Harrold Cunningham will teach aerial navigation, and Lieut. Winston is flight instructor. Lieut. Winston has a class of 12 students, and is flying every day. He expects to add a monoplane to the school when the fall term begins.

A PLANE named *The City of Stockton* will be entered in the Woman's National Air Derby, August 18, which will start from Santa Monica for Cleveland, Ohio, on that date.

CLAYTON ALLEN, piloting Bob Six's new OX-5 Travel Air, won first prize in the 15-mile race at the dedication of the Redding airport. He also made the best spot landing, but was disqualified when the throttle slipped and taxied him out of the circle.

A FOUR-DAY American Legion Air Circus was staged at the Stockton Municipal Airport, July 4, 5, 6, 7.

THE City Council of Newman has taken steps to acquire a municipal airport located on the northern edge of town.

LIND and Borth have a good class of students at Lodi, and conduct a regular flying service at their private field, 5 miles north of town.

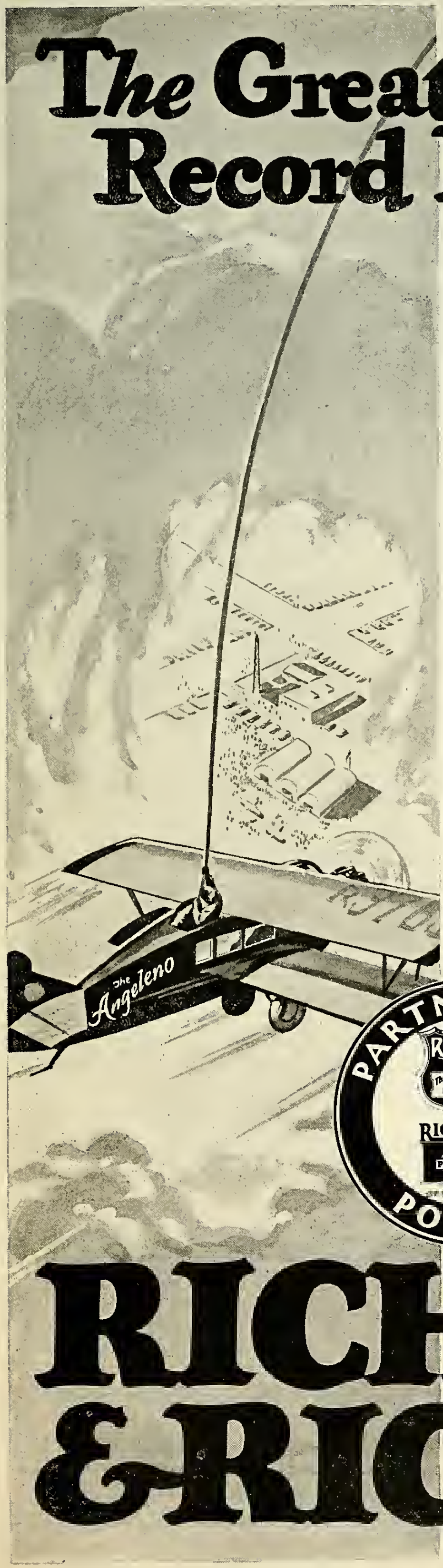
Bill De Vries, manager of Tracy Airport, is getting a new OX-5 Eaglerock and has a class of 10 students.

Ben Furrow, a licensed airplane and engine mechanic, is located at Tracy Airport.

Three floodlights have been installed, an electric siren, border lights, rotating beacon,

(Continued on next page)

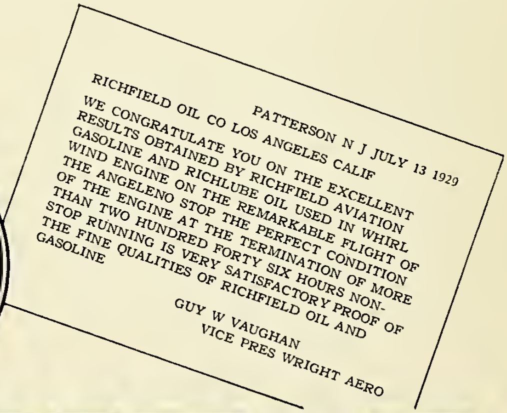
The Greatest Endurance Record Ever Made!



DROPPING their plane gently to earth in a perfect landing at 2:13 p.m. Friday, July 12th, at Culver City Airport near Los Angeles, Loren Mendell and "Pete" Reinhart, co-pilots of the Buhl, Wright motored, air sedan "Angeleno" completed the greatest endurance flight in history, establishing a record of 246 hours, 43 minutes and 32 seconds in the air.

Both flyers paid high tribute to Richfield Gasoline and Richlube Motor Oil which, after exhaustive tests, they selected for the flight. Carrying an over-load of almost seven hundred pounds, the gasoline consumption was less than twelve gallons per hour, and the oil, less than one quart an hour. As Reinhart expressed it, *"The needle on the oil gauge might just as well have been painted on—the pressure did not drop a pound during the entire flight."*

Once again Richfield has helped make air history just as it did in the "Question Mark" army flight, in Captain Wilkins' thrilling hop over the North Pole, and in many other speed and endurance flights. Use Richfield and Richlube in your own plane—the ideal combination for everyday flying—better by actual test.



PATTERSON N J JULY 13 1929

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WE CONGRATULATE YOU ON THE EXCELLENT RESULTS OBTAINED BY RICHFIELD AVIATION GASOLINE AND RICHLUBE OIL USED IN WHIRL WIND ENGINE ON THE REMARKABLE FLIGHT OF THE ANGELENO STOP THE PERFECT CONDITION OF THE ENGINE AT THE TERMINATION OF MORE THAN TWO HUNDRED FORTY SIX HOURS NON-STOP RUNNING IS VERY SATISFACTORY PROOF OF THE FINE QUALITIES OF RICHFIELD OIL AND GASOLINE

GUY W VAUGHAN
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PARTNERS IN POWER
RICHFIELD The GASOLINE OF POWER
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RICHFIELD & RICHLUBE

A group of Western aviation enthusiasts: Left to right—standing, Si Morehouse, J. C. Gilbert, George Finley, Walter A. Thurber, A. F. Bridge, Rear Admiral H. V. Butler, Dr. Robert A. Millikan, Walter Clausen; lower row, F. H. Bivens, Herman Michel, Fred Goodcell, Tom Curran.

(*California News Continued*)

and obstruction lights will soon be placed on a power line which parallels the field.

W. W. JENNINGS, of Ceres, has his new *American Eagle* at the new Modesto private airport. Doc Henderson is his pilot, and they conduct a regular flying service and school.

Penfield Bros. are doing a good business at the Modesto Municipal Airport, which is located inside the city limits.

OAKLAND

[HOWARD V. WALDORF]

COMPLETION of negotiations for the leasing of 10 acres of the Oakland Municipal Airport to the Boeing Air Transport was announced July 6 by the port commission. Facilities needed with the expansion of the Boeing system base are to be erected in the area. The first of these facilities is to be an airplane repair depot. It was indicated that the area is ultimately to be used as the site of a commercial airplane factory. Under an agreement reached with the port commission, the Boeing company has taken options on the property, the first of which is to be exercised within a year. A long term lease, said to be for 25 years, has been drawn up for approval by the port commission. The property, fronting on San Leandro Bay, adjoins the present base of the Boeing Air Transport and of the Pacific Air Transport, a subsidiary organization.

To handle the freighting of supplies and equipment to the repair depot and other facilities to be erected in the area, the Southern Pacific Railroad is to establish rail service between the airport and its main line. Work on the repair depot is scheduled to start shortly.

WITH the withdrawal July 1 of financial aid of the Guggenheim Fund, the United States Weather Bureau and Department of Commerce took over complete control of the Pacific Coast chain of upper air weather reporting stations. The chain has its headquarters at Oakland.

The action of the federal forces was marked by the inauguration of hourly voice broadcasts to planes in flight. These broadcasts, giving weather conditions on the Oakland to Los Angeles airway and a summary of conditions at points off the airway, are sent out simultaneously from the Department of Commerce radio stations at Oakland, Fresno and Glendale.

All weather data are gathered by telephone and telegraph at Oakland Municipal Airport. D. M. Little is in charge of the chain for the Weather Bureau, and T. K. Johnson for the Department of Commerce.

ON a nation-wide inspection tour of naval stations, Ernest Lee Jahncke, Assistant Secretary of the Navy, arrived at Oakland Municipal Airport in a trimotor Ford monoplane after a flight from Washington, D. C. Lieut. W. C. Tomlinson, his aide, piloted the plane. Jahncke then went to Honolulu by steamer to inspect the Pearl Harbor station. On his return, he inspected the Oakland airport naval reserve base, and then departed for San Diego.

FLYING his Fairchild J-6 cabin monoplane, W. J. Barrows of Oakland Municipal Airport won the 20-mile Australian pursuit race, which was a feature of the dedication program at the Eureka, Calif., airport. Barrows' time was 9 minutes and 33 seconds.

THE foundation for Hangar No. 5 at Oakland Municipal Airport was completed July 1. The structure, 300 feet by 150 feet in width, including a two-story lean-to, has been leased to the Boeing System. The Boeing aeronautical college, and the operating bases of the Boeing Air Transport and Pacific Air Transport are to be located in the hangar.

Work on Hangar No. 6, to be leased to the Naval Air Service, is scheduled to start shortly.

WORK on a two-cycle radial air-cooled aircraft engine is under way at the Oakland factory of the Aeronautical Engineering Company. A 165-200 horsepower engine, measuring 31 inches in diameter and weighing less than 200 pounds, is nearing completion. Following block and flight tests, the engine is to be exhibited at the aeronautic exposition at Cleveland, according to present plans.

TO attend the graduation of his niece, a Mills College student, Governor George A. Parks of Alaska flew from Juneau to Oakland Municipal Airport, a distance of 1,785 miles, in 14 hours and 39 minutes flying time. A Wasp-Lockheed of the Alaska-Washington Airways was used.

APPLICATION for patents for a giant airliner, which he declares will carry 115 passengers and freight at an unusually high speed, has been made by Capt. Ienar E. Elm, head of an Oakland ground school and former Army instructor. The plane would be of the monoplane type, with a spread of 288 feet, and would land at a slow speed. In general, the craft would be conventional in design, Capt. Elm said.

AIDED by night flights, which were inaugurated during the month by several commercial aviation concerns, air operations at Oakland Municipal Airport for June showed a marked increase over the previous month. Figures announced by the port commission were: landings, 8,106; passengers, 4,794; student flights, 974. The figures for May were: landings, 6,900; passengers, 3,858; student flights, 953.

HILTON LUSK of Oakland, formerly head of the aeronautics department at the College of the Pacific, has been appointed dean of the Boeing aeronautical college which will open at Oakland Municipal Airport September 15.

WITH recent rate reductions by western air transport companies, the rates from Oakland and Alameda to Los Angeles now range from $22 to $38. The rate to Portland, formerly $68, has been slashed to $40, and to Seattle from $80 to $50.

With the fare changes, the schedules on the lines of the Pacific Air Transport have been changed to give faster service. On the northbound trip between Seattle and Los Angeles one hour and forty-five minutes is cut off, while the southbound trip is made in one hour and fifteen minutes less than the old schedule. On the new schedule, mail leaving Los Angeles at midnight reaches San Francisco Bay before daylight, is delivered in Oakland on the 8:00 a. m. carrier service, reaches Portland and Columbia River points by 10:30 a. m., and Seattle and Tacoma by noon. All Pacific Air Transport Boeing planes are to be repowered with Hornets instead of Wasps, as the air mail and passenger loads have been increasing.

The Maddux Air Lines operates three planes daily between Alameda and Los Angeles. The Western Air Express has

(*Continued on next page*)

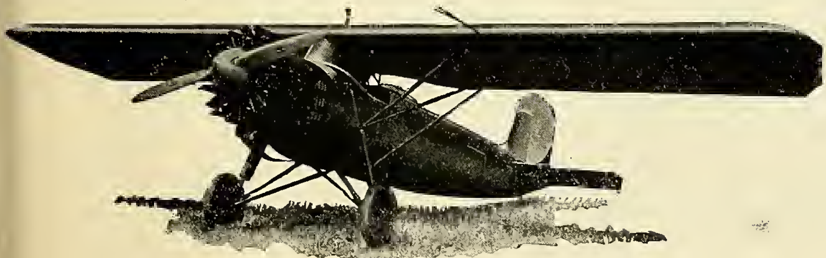
MORELAND MONOPLANES

Careful People

like to fly in sturdy Morelands

On exhibit at the National Aeronautical Show in Cleveland, Aug. 24 to Sept. 2nd.

Inspect:
- our workmanship,
- our graceful design,
- our color effects,
- our easy inspection of all parts,
- our new cabin,
- our many other useful features.



Moreland Aircraft Inc.,
Los Angeles Municipal Airport
Inglewood, Calif.

Pictures, Pamphlets sent on request

(California News continued)

increased its Oakland to Los Angeles service to two planes a day.

The Pacific Air Transport, unit of the Boeing System, operating the Los Angeles-Oakland-Seattle air mail, passenger and express service, is taking a leading part in the rate war.

ALAMEDA

[Howard V. Waldorf]

PREPARATIONS to establish a seaplane training school at Alameda Airport are being made by the Curtiss Flying Service under the direction of Capt. F. M. Bartlett, district manager. The school is to be located in the yacht harbor, which is a unit of the airport development program.

WITH the increase of service by the Maddux Air Lines and the Continental Air Express, five round trips a day are now made between Alameda Airport and Los Angeles. The Maddux company has added a second non-stop express plane, bringing its daily service to three planes a day. The Continental organization has doubled its service through the addition of an afternoon plane.

THE 250-acre area on the western Alameda waterfront on which the San Francisco Airdrome, Inc., plans to spend $1,000,000 in developing a modern air terminal, is now being drained. The area, leased from the University of California, adjoins the proposed Pacific Coast Army air base, which in turn adjoins Alameda Airport.

According to present plans, the San Francisco Airdrome terminal will be opened to air traffic in less than two months. Western Air Express, operating a non-stop service between Oakland Municipal Airport and Los Angeles, plans to establish its northern base at the Alameda airdrome, according to announcements by company officials.

TO protect passengers from injury by the whirling propellers, a covered gangway extending from the loading platform to the waiting rooms is being used at Alameda Airport.

MADELYN KELLY, Alameda airport's official hostess, and Capt. W. H. Royle are taking a leading part in the weekly aerial programs being staged at the flying field each Sunday.

ARIZONA

[Harold G. Wilson]

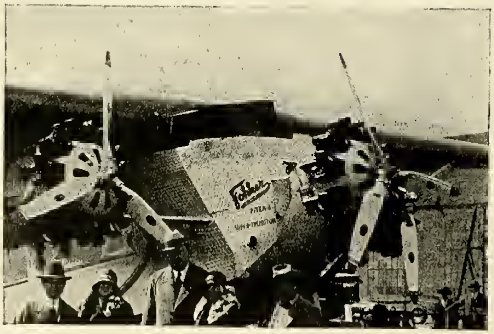
THREE thousand people attended the dedication program of Winslow's T. A. T. airport. The old West and the new were contrasted by the participation of native Indians, who danced in their native regalia, and music was furnished by the Santa Fe Indian band. Speakers for both Winslow and T. A. T. heralded the future of aviation. The T. A. T. service was started through Winslow on July 8, with the arrival of the eastbound *Columbus*. The *City of Washington*, westbound, arrived July 9, carrying among others, Miss Amelia Earhart as a passenger. Colonel Lindbergh piloted the *Columbus* into Winslow.

A PERMIT to establish a scheduled air service from Nogales, on the Mexican border, to Winslow, in the northeastern part of the state, has been granted the Southwest Air Service, Tucson. Although details have not been worked out, it is known that the company plans a daily service with stops at Tucson, Phoenix, Prescott and other intermediary points. It is known, too, that the company is considering merging with other Arizona operating companies to form a larger concern which will establish airports in all parts of the state, maintain flying schools and possibly an assembling plant. Del Jones is president of the Southwest Air Service.

ALL Kingman and many representatives from Arizona cities were present for the dedication of Port Kingman. The field is one of the stopping points on the new T. A. T. line. Equipment includes a $60,000 radio station, floodlights, boundary lights, ceiling light, administration building, aero car which is patterned after the interior of the passenger planes, trucks and tractors. W. J. Black, president of the Mohave Chamber of Commerce, was in charge of the program and made the dedication speech. Several Army planes from Rockwell Field attended the dedication.

(Continued on next page)

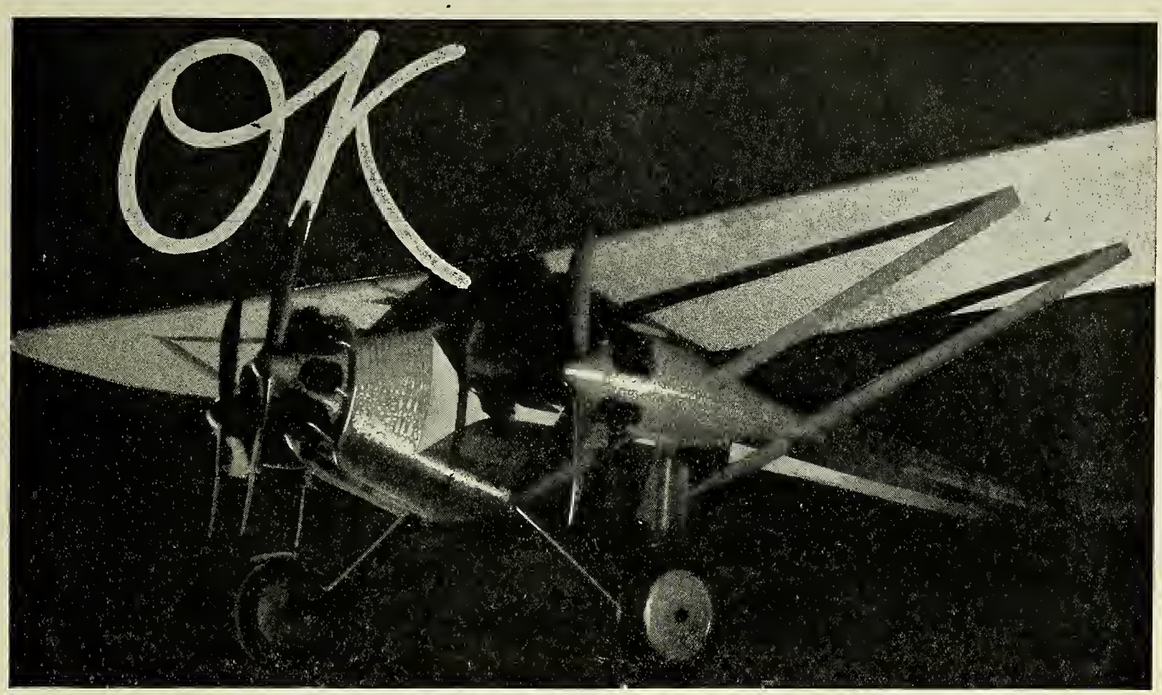
DEPENDABILITY



When Standard Airlines, Inc. ordered a fleet of Super-Trimotor Fokker monoplanes to place into operation on the „Fair Weather Route" between Los Angeles and El Paso, via Phoenix, Tucson, and Douglas, Pratt & Whitney engines were specified. Officials and engineers knew that no other motor could deliver to such a high degree of perfection, the performance that air line transportation demands • The Aero Corporation of California, operators of Standard Airlines, has been awarded authorized service and parts sales in Southern California, Arizona, New Mexico and Texas.

AERO CORPORATION OF CALIFORNIA

9401 South Western Avenue Los Angeles, California



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Like the Kreutzer Tri-Motor Air Coach franchise because it is profitable and it is one upon which they can afford to spend time and effort, knowing that their customers are getting more than their money's worth (Tri-Motor dependability at $16,800 Flyaway, Los Angeles . . . . or less than half the cost of any other tri-motor ship with anything like similar performance) . . . . and at the same time knowing that they are building for the future with an organization that is both permanent and stable. There is territory open for dealers or distributors who really mean business.

JOSEPH KREUTZER CORPORATION

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U. S. Dept. of Commerce Approved Type Certificates Nos. 170 and 171

(*Arizona News continued*)

THE Arizona Flying Service, Phoenix, plans to inaugurate a passenger line from Phoenix to Wickenberg, Flagstaff, Ashfork, Williams, Winslow and Holbrook. A survey trip over this route was recently made by G. W. Brophy, president and general manager, Verne R. Quintal, vice-president, and J. Harley, representative of the Cessna Aircraft Company.

A SECTION of the transcontinental airplane weather service has been started by the U. S. Weather Bureau in Phoenix. The reports are secured in coöperation with the Transcontinental Air Transport, the Santa Fe railroad system and the Pennsylvania railroad, from observers in many parts of the Southwest.

A MODEL Airplane League, limited to 24 boys, has been organized by Charles Dietz, of the Safford School, Tucson. Meetings are held twice weekly and some fine models have been constructed. The record model stayed aloft 1 minute and 10 seconds.

AUGUST 1 has been designated as "Aviation Day" in Arizona, as a compliment to the Standard Airlines, Inc., which on this date is to inaugurate its increased service. Fourteen-passenger tri-motored Fokkers are to replace the six-passenger single-motored planes the company has been using since the line was established nearly two years ago. Three of the large planes have been purchased by the company for the start of the service. Celebrations are planned at Phoenix, Tucson and Douglas.

JACK W. DUELKS and A. A. Barrie, representatives of the American Aircraft Corporation, came to Arizona the early part of July for the purpose of outlining a proposed air mail and passenger route. They were traveling in a Waco 10-T, powered with a 220 horsepower J-5 Wright Whirlwind.

WESTERN AIR EXPRESS is seeking to acquire land in Kingman, which it proposes to develop as a modern airport for use of planes on the air passenger line now running from Los Angeles to Kansas City. One tract adjacent to the T. A. T. field was seriously considered.

THE Phoenix Aircraft Company has started construction of a manufacturing plant in Phoenix. The company plans to build three-place open biplanes. Machinery and other equipment for the plant has been ordered. Charles H. Roberts, Dayton, is president of the company, and Floyd Stahl, Phoenix attorney, is secretary-treasurer.

THE Chandler airport was formally dedicated July 1. Funds for the airport were donated by Dr. A. J. Chandler. A large hangar has been erected. Dudley M. Steel, of the Richfield Oil Company, and George E. Irvin were among the visiting fliers present.

NEW MEXICO

[TED MAGEE]

GOVERNOR R. C. DILLON of New Mexico, Gene Howe, an editor of Amarillo, and dozens of other celebrities were in Clovis for the opening of the Transcontinental Air Transport field in July.

Col. Charles Lindbergh, making an inspection trip across the route, landed at the airport too late for the ceremonies. His ship was the first airplane to make a night landing.

A THREE-PLACE open type Butler Blackhawk was brought to Albuquerque Airport recently for taxi and sightseeing duty. Aircraft Holdings, Inc., owner of the airport, recently purchased a Ryan six-place cabin job for similar work.

THE Kansas City-Amarillo-Albuquerque-Los Angeles route is becoming increasingly popular, with travel rapidly increasing in this direction. Recently seven ships landed and took off from Albuquerque Airport in five hours' time.

AIRPORTS are to be constructed in Santa Fe, Gallup, and Las Vegas by the North American Airways, according to an announcement of an official of that company who has been traveling the state recently acquiring sites.

(*Continued on next page*)

LEARN TO FLY

ANGELUS AERO CORP.

TRAIN for the air where Hollywood learns to fly! Offering a complete ground and flight course, using approved equipment of most modern type, thoroughness is further assured by individual instruction. Write for complete information.

The Angelus Aero Corporation, dealers for Standard Oil Products, is fully equipped for complete engine overhaul service.

Angelus Aero Corp., Metropolitan Airport
Van Nuys , , , , , California

"The Goddess of the Air is Richly Rewarding those Men whose Vision is no Longer Earthbound."
—Keeler. L. L. B.

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What will you be tomorrow? Will you be reaping the rich rewards that aviation is paying to those who KNOW? Or will you be plugging . . . plugging along in the same old rut?

Aviation is the fastest growing phase of our commercial life. Pilots, mechanics, welders, field superintendents, all classes of executives are in demand . . . . and the demand for trained men is far exceeding the supply. The good jobs are hunting the right men.

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State..............................

(New Mexico News continued)

WORK on the new Western Air Express landing field at Albuquerque is progressing rapidly. Because this point is to be the crossing of the Denver-El Paso line yet to be started and the Kansas City-Los Angeles line, Albuquerque's field is to have a roundhouse, machine shops, a small hotel, depot, and dining room.

The new flying field is west of the Rio Grande River and approximately three miles from the heart of the city. The field will be lighted with the latest type of equipment.

GROUND at Tucumcari was purchased recently by Western Air Express for a landing field in that town. The company plans considerable developments at the field.

HAWAII

[Verne Hinkley]

PROBABLY the most interesting event in aeronautical circles here in many weeks was the expedition sent by the Army Air Corps to the island of Hawaii, 200 miles southeast of Honolulu, to search for traces of the *Golden Eagle,* lost in the Dole race from Oakland to Wheeler Field nearly two years ago. Eleven planes flew to a base at the Waiakea airport, Hilo, from which point a photographic survey of the territory in which it is believed the missing ship might have crashed, was made. In addition to the Army's Fokker transport, there were four amphibions, three Keystones and three Martins.

On the flight to Hawaii, which was under the command of Captain Lloyd L. Harvey, an incident occurred which made Sergeant Philip Monroy more or less of a hero. Riding in a plane piloted by Lieutenant A. H. Foster, Sergeant Monroy went out onto a wing and poured water from canteens into a radiator after vibration had jarred a petcock open, allowing the cooling fluid to escape. The ship was at a high altitude over the open sea between Maui and Hawaii at the time. Lieutenant Foster feared he would be forced down into the channel but because of Sergeant Monroy's nerve he was able to land at the Upolu Point field at the northwestern tip of the Big Island, in safety. The petcock adjusted properly, the flight was resumed to Hilo without incident.

WITH the inauguration of Hawaii's new governor, Lawrence M. Judd, an altered territorial aeronautical commission will take office. The chairman will be R. A. Anderson, World War veteran who was shot down behind the German lines; George I. Brown, Frank O. Boyer, Cyril F. Damon, Henry E. Wooldridge, another World War flier; Dr. Rufus H. Hagood, Jr., and Edward L. Peacock.

FREDERICK STOCKS, Honolulu youth who is soon to be graduated from the advanced flying school of the Army at Kelly Field, has been assigned to Wheeler Field and will come back to Hawaii upon completion of his course.

CAPTAIN LOWELL SMITH of the Army's 'round-the-world flight in 1924, recently left on a transport en route to Buffalo where he is to be Air Corps representative at the Curtiss factory. Before sailing, he announced that he is considering offers from three commercial aviation companies of the mainland, all of them prominent in aviation.

OFFICERS of the Inter-Island Airways, Ltd., formed here to open a commercial line between the major islands of the group, this fall, are planning the erection of a $30,000 hangar at John Rodgers Field, Honolulu's municipal airport. It will be the company's first permanent structure on any island airport. A proposal to operate out of Honolulu harbor has been given up. The service will be conducted with twin-motored Sikorskys.

THE territory of Hawaii has brought suit against the Pioneer Mill Co., of the island of Maui, to obtain title to 113 acres of land situated near Hanakaoo, the area to be used as an airplane landing field. Once the site is secured, the chain of fields from Kauai to Hawaii will be complete. Maui is now the only island of the group on which there are no facilities for the reception of aircraft.

PURSUIT planes from Wheeler Field took an official part in the recent dedication of the Western Pacific Air Transport field on the Ala Moana, one of Honolulu's chief avenues. Lieutenants R. J. Minty, Darr H. Alkire and Norme D. Frost flew the ships.

CANAL ZONE

DURING the past month J. B. Trippe, president of the Pan American Airways, visited Panama enroute to Venezuela and Colombia. With him were several other officials of the company who flew in one of the regular mail planes from Miami to Cristobal. While here he announced several new proposed routes of the company and the girdling of the Carribean by connecting the West Indian Islands with Cristobal via Curacao and Trinidad.

THE amphibion *Southern Star,* flagship of the International Airways, Inc., which plans to open an air mail and passenger service between New York and Buenos Aires by the latter part of the year, with its president, J. B. Montgomery, stopped over the Fourth of July in Cristobal en route to South America. The plane had attempted a non-stop flight to Peru but bad weather during the early part of the trip caused it to make several stops in Central America.

THE Isthmian Airways, Inc., has added another Hamilton all-metal monoplane to its equipment and now has two planes in its regular tri-daily trans-Canal run. This company has carried over 1,400 passengers since it started its service early in May and has made close to 400 trips across the Canal. The line is proving very popular with tourists, and its president, Ralph Sexton, is looking forward to a successful tourist season.

NORTHWEST

[F. K. Haskell]

AVIATION patrol for forest fire defense from the Pacific Ocean to Wenatchee and from the Canadian border to Oregon was inaugurated July 1 under the supervision of Alex Holden, president of the Washington Aeronautical Company, Tacoma, Wash. Of the three bids submitted this company was low, having offered its services at $53 an hour for a guarantee by the Government of 150 hours of patrolling during the three and one-half months Washington forests will be under observation.

PRIZES aggregating $6,000, in addition to "lap money," will be posted for entrants in the Portland-Cleveland air derby, to start August 24. Thirty or more entries are expected for the race, which will be for open cockpit and mail planes powered with Wright J-5 engines.

THE division of airways, U. S. Department of Commerce, has leased 30 acres five miles west of Sprague, Wash., for a government airport in the Spokane-Portland air mail system. The field will be in a T shape with a runway of about half a mile north and south and one 1,800 feet long east and west. This is to be one of the four airports between Spokane and Pasco, the others to be at Connell, Lind and Cheney. The plan calls for an airport every thirty miles and a 2,000,000 candlepower rotating beacon every 10 miles along the route.

FURTHER lighting equipment is being provided at the Grays Harbor Airport with the installation of a flashing beacon. The field is already supplied with floodlights.

DEDICATION ceremonies were held at the Bremerton, Wash., airport and were attended by some 1,000 persons, including a number of officials from the U. S. Navy yard there. Exercises also included an air circus.

THE Boeing System recently celebrated the second anniversary of the establishment of the transcontinental service between the Pacific Coast and Chicago, incidentally completing 5,750,000 miles of flying. The company's fifty-five pilots operating, not only in the transcontinental run, but also the Seattle-San Francisco route, observed the day in twenty-two cities.

Since the service was inaugurated more than 6,000 passenger and 1,300 tons of mail have been handled with but three casualties.

The Boeing company and its subsidiaries have adopted plans for extensive expansion, including the building of a modern airport in Los Angeles county, construction of a hangar at Boeing Field and a seaplane hangar on Lake Washington for use in Seattle-Alaska service.

IN order to develop further the airport at Olympia, Wash., additional members have been named on the airport committee including Bliss G. Sinclair, president of the Olympia chapter of the National Aeronautic Association; E. M. Chandler, engineer; Neil R. McKay, county engineer; Ross Dye and Hugh Jeffers.

LIEUT. E. E. GARBUTT, of the Hill Aeronautic School, won the airplane race from Swan Island airport, Portland, to Grand Dalles, Wash., having flown the distance in 40½ minutes. Dick Rankin, of the Rankin Flying Service, was second, and J. B. Alexander of Vancouver, Wash., was third. The race was in connection with the opening of a new landing field at Grand Dalles, across the Columbia River from The Dalles, Ore. Garbutt flew a Travel Air, Rankin a Waco, and Alexander a Curtiss Robin.

THE 215-acre municipal airport at Salem is to be dedicated as a part of the program of the state American Legion convention to be held in that city August 8 to 10. Four runways are provided, ranging from 3,300 to 4,800 feet in length, 100 feet in width with a 500-foot clearance overall. Soil conditions are such as to permit flying through the wet winter months, and the entire tract is tilled and graded so that ships may land off the runways. In addition, five acres of land have been purchased by the Eyerly Aircraft Corporation, which has erected an 84 by 98-foot building for manufacturing purposes. Lee Eyerly, president, will have charge of the airport. A private dwelling is being used as an administration building. An office and school building are also part of the equipment. Bids will be opened by the city council August 5 for the construction of a municipal hangar 80 by 100 feet, with a 17-foot lean-to along one side for work and machine shops. A sleeping room, office, rest rooms and washing sump are also included.

OREGON'S new state board of aeronautics, appointed by Governor I. L. Patterson, includes J. G. (Tex) Rankin, of the Rankin Flying Service; Lieut. E. E. Garbutt, head of activities at the Hill airport, and Lieut. Basil B. Smith, of the Rankin service, all of Portland.

THREE complete courses in aeronautics will be offered by the Oregon Agricultural College in the fall. The first is a four-year course in aeronautical engineering; the second a two-year pre-flying school training course to qualify men for either the Army or the Navy schools; and the third for those seeking a combination of technical and commercial training. No actual flying is included.

(Continued on next page)

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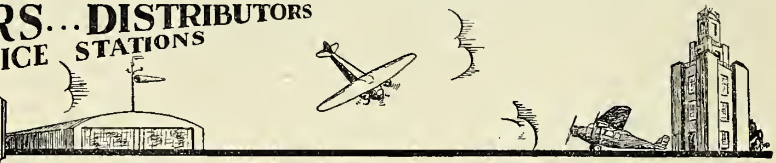

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(*Northwest News continued*)

WITH Vance Breese as pilot, the *City of Portland*, the first of the Breese Aircraft Corporation ships turned out in Oregon, made a flight through the state under the auspices of the industries department of the Portland Chamber of Commerce. Accompanying Breese were George Wisting, of the chamber of commerce, and George Love, special sales representative for the Breese firm and chairman of the national American Legion committee on aeronautics.

WASHINGTON

[C. M. LITTELJOHN]

CAPITALIZED at fifty thousand dollars, the Walla Walla Airlines is a new organization incorporated at Walla Walla, Wash. The incorporators of this company are J. A. Kinnear and H. E. Roche.

FLYING post offices are now being provided as the volume of air mail continues to grow and additional facilities are required for the dispatch of air mail. The Boeing Airplane Company at Seattle is building a large fleet of tri-motored transports which can carry three tons of mail, or 250,000 letters, at a speed of 135 miles per hour. Although partitions are now being provided for passengers, the planes are so designed that this equipment may be removed to make them exclusive mail-carriers, or aerial post offices with space for letter clerks, mail sorters, and other postal employes who may fly with the mail in the future.

PASSING its second birthday recently, the Boeing System remarked that during its two years of infancy it has flown a mileage equivalent to 230 times around the world. The record of the two years growth of this organization started at Seattle, Wash., may be seen in its flight of 5,750,000 miles, its carriage of 1,300 tons of mail, of approximately 6,000 passengers, and its many thousands of express shipments of various kinds.

COMPOSED of twelve aviation companies, the Aviation Operators' Association of Seattle is taking a determined stand against questionable exploitation of commercialized flying. A. B. Hayes, the newly elected president of the association, has gone on record against fly by night promotion schemes and the promiscuous sale of stock in new aviation organizations of doubtful virtue to a gullible public.

At the recent election of officers of the operators' association when Mr. Hayes was chosen president, Capt. M. W. Giddings was selected as vice-president, and Kenneth C. Benfer was re-elected secretary and treasurer.

THE Sand Point aviation field of the Navy is growing rapidly. The Navy is expending millions in its development program now under way at this location. A hangar twice the size of the structure on Boeing Field, Seattle, is rapidly being completed. A whole acre of floor space to house many Navy planes will be provided in this new hangar. Barracks which will house a number of Navy men are being built, as is a machine and plane overhaul shop.

COLORADO

[ROBERT C. CLEMINSON]

THE Curtiss Flying Service of Colorado was to open a flying school at Denver in July. Major Bruce Kistler is general manager and vice-president; Capt. Ralph J. Hall, field and operations manager; Capt. Aubrey Keif, traffic and public relations manager; Capt. Carlos Reavie, chief pilot; and J. E. Chelf, chief mechanic.

THE National Air Colleges, Inc., has opened a flying school in Denver. This group is using the old Alexander airport in South Denver. The officials of the organization are Jack Willoughby, Bob West, and Jack Payment. Eaglerock planes are used for instruction purposes.

THE Colorado Airways, Inc., of Denver, sent four planes to the Firemen's Celebration held at Laramie, Wyoming, on July 3rd, 4th and 5th. The personnel of the Colorado Airways is as follows: President and general manager, A. F. Joseph; assistant manager and secretary, Angela L. Joseph; vice-president, Richard Peavy; chief pilot and mechanic, Walter Higley; instructor, Homer Sweet; pilot, E. V. McCory;

(*Continued on next page*)

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(*Colorado News continued*)

mechanics, Mel Coeur and Ted Downs; and assistant mechanic, W. M. Olsen.

They are buying four new training planes and have a total of 25 students, including four women.

THE Colorado State Public Utilities Commission has issued state licenses to four aerial transportation lines. They are the Travel Airways, Inc., of Colorado Springs; Colorado Airways, Inc., at Denver; Pike's Peak Air Commerce, Inc., of Colorado Springs; and United States Airways, Inc., operating between Denver and Kansas City.

THE Denver Municipal Airport is now ready for use. The field is fully lighted for night flying. William F. Wunderlich is field manager.

A FLYING club was recently organized in Cañon City. Phil Reid is instructing members in the club's Hisso-Eaglerock.

THE American Legion airport at Salida was opened on July 4. The Pike's Peak Air Commerce, Inc., of Colorado Springs, had a Ford tri-motor, a Ryan Brougham, and three Eaglerocks at the celebration.

THE first annual Aircraft Exposition and the second annual Pikes Peak Air meet will be held at Colorado Springs, August 9th, 10th, and 11th. August 9th will be devoted to a program of dedication at the Alexander Airport, and on the 10th and 11th the exposition and air meet will be held at the Colorado Springs Municipal Airport. Sanction has been received from the Aeronautical Chamber of Commerce of America for a Class C show.

Airplanes and other exhibits unaffected by weather conditions will be outside. Space will be furnished inside a steel stucco hangar, 100 feet by 100 feet, for exhibits which must be under cover.

A CLASS for airplane salesmen was opened on July 15 at the Alexander Aircraft Company plant at Colorado Springs, Colo. The classes, which are free and open to all who intend to sell airplanes, last 15 days. A new group will be organized at the end of each period. Classes are limited to 12 persons, and are conducted by Justin A. McInaney, vice president in charge of sales for the Alexander Aircraft Company.

DR. MAX M. MUNK, an authority on aerodynamics, has been retained by the Alexander Aircraft Company of Colorado Springs. Doctor Munk joined the engineering department of the Eaglerock factory on July 1. His experience includes six years on the research staff of the National Advisory Committee on Aeronautics, Washington, D. C.

THE COLORADO Airways, of Denver, are conducting a flying school and airplane sales service. Walter Higley and L. V. MacCory are chief pilots for the firm, and Richard Peavey is the newly elected vice president in charge of the company's fleet of planes.

IDAHO

[Ida M. Durnin]

WHAT may be the first passenger airplane route to be established within the boundaries of Idaho was to begin operations on July 15. The proposed route will be between Boise and Pocatello, and stops will be made at Twin Falls and Burley.

THE Aberdeen Chamber of Commerce, at a recent meeting, authorized the immediate purchase of 160 acres of land for a site for a golf, aviation and recreation field.

The land lies in a square and will afford a 2,690-foot runway in all directions.

Four Governors Call Salt Lake Aero Conference

CHIEF executives of Utah, Wyoming, Idaho and Oregon united in an agreement at the recent air conference, to call a conference of the Western governors in Salt Lake City, August 26 and 27, the objective being a thorough discussion of all common problems of reclamation, highways, aeronautics and other subjects of general interest to the public land states.

"For a long time," said Governor Baldridge, of Idaho, in discussing the move, "the West has been in need of such a conference that might end eventually in the organization of a compact unit of the 11 Western states. Until now there has not been present at

(*Continued on next page*)

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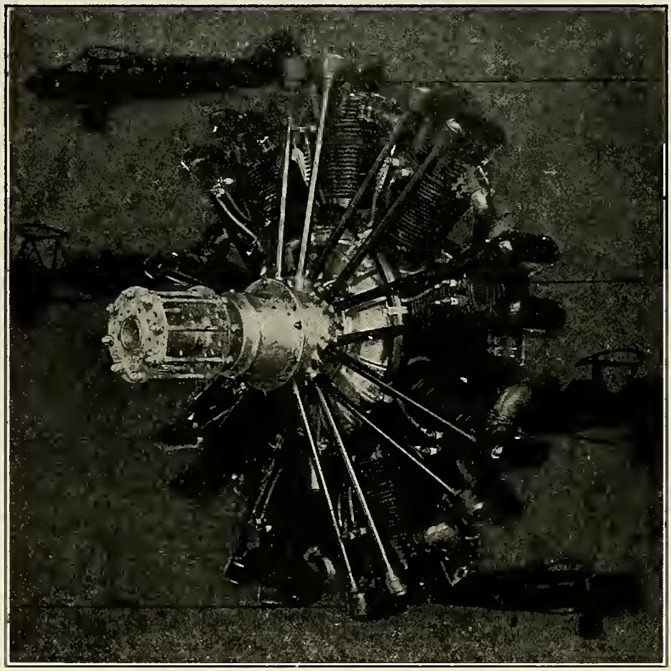

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(Idaho News continued)

any one place as representative a group as is now present at the Western States Air Conference. For this reason concerted action was determined on."

THE Mountain Home airport is now ready for the landing of the largest ship that may come to it. In addition to the leveling and grading of the field, a large ground marker was installed. The marker will serve the purpose of indicating to aviators the center of the field.

A HUGE tri-motored Ford plane landed in Boise airport recently bringing with it F. F. Chatterton, of the Ford Company aviation division. The ship of the Standard Oil Company was piloted to Boise from San Francisco by A. R. French.

[GLEN PERRINS]

THE county commissioners have approved an air field near Malad, and negotiations will be started for the purchase of a site in the near future. The airport will be constructed under federal aid and plans.

BOISE has voted a bond issue of $78,000 for improvement of the local airport. It was the second vote on the issue, the first election last April having resulted in defeat of the then $85,000 issue.

A new airport with a runway nearly a mile long was completed to provide facilities for the planes coming to the Western States Air Conference. The airport is located on the bench four miles south of the city.

UTAH

[GLEN PERRINS]

CELEBRATING the first anniversary of the dedication of the Ogden airport, thousands of persons visited the field June 30 and watched stunts, parachute jumps, took plane flights and attended the christening of the new monoplane, *Pegasus,* of the Union Pacific Airways, Inc.

PLANS are under way to construct an airport at Logan on a site which includes approximately 91 acres and which the city commission has agreed to purchase for $6,675. The total cost of developing the airport will be $8,475.

PLANS for the establishment of an airline between Denver and San Francisco by way of Salt Lake City are being considered by the Pacific Aviation, Inc., according to word received here from Captain Howard D. Le Fevre, a representative of the company.

THE first motorless aviation club in Utah has been organized and a glider constructed upon the University of Utah campus by the students. The trial flight is scheduled for an early date.

The glider is made of spruce and mahogany plywood, chrome-molybdenum steel tubing, and the wings are covered with Flytex airplane fabric.

Interest in gliders is growing in Utah, where rolling slopes and mountains make for ideal gliding conditions.

AIR travel will soon cost less than rail, according to James G. Woolley, vice-president in charge of traffic for Western Air Express. This line has brought the intermountain region much closer to the great markets of southern California, he said. Air transport rates are due for a cut soon, he predicts.

IN order to increase the efficiency of the operation departments of the National Parks Airways, Inc., about 40 men will be transferred from the Salt Lake hangars and offices to Butte, Montana, and to Cheyenne, Wyoming, according to Alfred Frank, president of the National Parks Airways.

THE road to Salt Lake's municipal airport is being paved and improved. A $150,000 bond issue for improvements is favored. More hangars are needed for the Pickwick Airways line.

ADVANCE instruments and instructions for the aerokartograph maps to be made of Bryce Canyon in 1930 were received here by Ralf R. Woolley, United States geological surveyor, from Dresden, Germany. So far the southern Utah canyon has been unconquered by map makers.

SEVERAL additional airlines leading from Salt Lake are expected to be inaugurated with the completion of the plans of the Seagull Air Lines, Inc. The company, which is incorporated for $100,000, is already planning two short passenger lines out of Salt Lake, and will seek several mail contracts, it is said.

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AERONAUTICAL INDUSTRY

FIVE AIR SCHOOLS APPROVED

FIVE civilian flying schools have been inspected and officially approved under the new Department of Commerce regulations for flying schools, according to an announcement of officials of the Department on July 19. They are the first to receive Government approval under the Bingham amendment to the air commerce act providing for rating of civilian air schools by the Secretary of Commerce in an effort to raise the standards of civilian flying schools throughout the country.

Embry-Riddle Flying School of Cincinnati and the Airtech Training School for San Diego have been approved as transport, limited commercial and private flying schools. Parks Air College, Inc., of East St. Louis, Ill., is rated for transport and limited commercial instruction. The Aero Corporation of California, at Los Angeles, is given limited commercial and private rating, and the D. W. Flying Service, Inc., of Leroy, N. Y., is approved as a limited commercial school.

Major Clarence M. Young, Director of the Aeronautics Branch of the Commerce Department, explains that the new law provides that the Secretary of Commerce rate the civilian schools giving instruction as to the adequacy of courses of instruction, suitability and airworthiness of equipment and the competency of instruction. The examinations are being made at the request of the schools.

GUGGENHEIM FUND INSURANCE SURVEY

HARRY F. GUGGENHEIM, president of the Daniel Guggenheim Fund for the Promotion of Aeronautics, recently announced the appointment of Captain Ray A. Dunn as consultant to the Fund in a comprehensive study of the question of aviation insurance. Because of the importance of life insurance to aviation, the Fund has asked Captain Dunn to conduct a survey looking toward the compilation of accurate and official data in regard to aviation mortality and in so doing to make available to the insurance underwriters those statistics which are necessary for the satisfactory stabilization of this unsettled question.

UNITED AIRCRAFT EXPORTS, INC., FORMED

THE formation of a new subsidiary to handle the export business of United Aircraft and Transport Corporation was announced recently by Frederick B. Rentschler, president. The subsidiary will be known as the United Aircraft Exports, Inc.

Without organized sales effort, foreign orders of the firm for the past year have been considerably in excess of $2,000,000, and most of this amount has come in recently. The airplane will become increasingly important in countries such as South America, China, Manchuria and parts of Russia where rail facilities are practically non-existent in vast stretches of territory, and where there are good landing facilities on both land and water, according to Mr. Rentschler.

LIGHT PLANE DISTANCE RECORD

DWIGHT B. (Barney) ZIMMERLEY set a new world's non-stop long-distance record for light planes on July 7 when he flew his LeBlond-powered Barling NB-3 low-wing monoplane from Brownsville, Texas, to Winnipeg, Canada, in 16 hours. The plane, which was powered by a 60 horsepower LeBlond engine, weighed less than 771 pounds, and carried a load of 871 pounds.

Zimmerley took off from Brownsville at 2:45 a.m. with 99 gallons of gas and 4 gallons of Kendall oil. To obtain a lighter load, he used a mixture of 10 per cent benzine and 90 per cent gasoline for fuel. He landed at Winnipeg at 6:45 p.m., having travelled 1,725 miles, beating by 753 miles the former light plane distance flight set by Harry J. Brooks last year in a Ford light monoplane. Zimmerley averaged a speed of 108 miles per hour on the flight, with a fuel consumption of 4 gallons per hour. When he landed he had 35 gallons of gasoline remaining, having travelled 27 miles to a gallon.

PLANE CATAPULTED FROM THE BREMEN

THE North German Lloyd liner *Bremen* arrived in New York on July 22 on her maiden voyage, after having set a new record for a transatlantic crossing, and inaugurated her ship-to-shore airplane service. European mail arrived in New York within five days after being posted. The mail seaplane was catapulted from the ship 20 miles off Fire Island.

Future plans call for the take-off at 300 miles on later voyages, the distance to be gradually increased to 600 miles, and a passenger plane service to be added later.

Baron Joachim von Studnitz, 27-year-old Luft Hansa pilot, and Karl Kirchoff, radio operator, took off by the catapult method from the *Bremen* about twenty miles east of Fire Island. The plane is a Heinkel low-wing monoplane on pontoons, powered by a Pratt and Whitney air-cooled Hornet engine.

MAIL ROUTE TO CHILE OPENED IN JULY

THE longest United States air mail route, the foreign air mail service skirting the west coast of South America from Cristobal, C. Z., to Santiago, Chile, started operating over its entire length of 3,900 miles on July 16. The service is flown by Pan American-Grace Airways, a subsidiary of Aviation Corporation of America and the W. R. Grace steamship interests.

The new service provides nine and one-half day air mail service between New York and the Chilean capital, and eight and one-half day service from Miami, the northern terminus of the Pan American air network over the Caribbean Sea and its extension into South America. Three days of the total is required for the Miami-Cristobal service and five and one-half days for the Cristobal-Santiago service. A section of the South American route between Cristobal and Mollendo, Peru, has been in operation for the last two months.

The new service will be operated weekly in each direction until additional funds for financing the foreign air mail services are granted by Congress. The schedule for the

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service in each direction calls for stops at Buenaventura, Guayaquil, Lima, Arica, Chanaral, and Santiago.

The rate for the new service is 45 cents per half ounce for mail from Cristobal to Chile and 70 cents per half ounce from Miami to Chile. Mail dispatched from any point in the United States under the 70-cent rate will be transported if practicable to Miami via the domestic air mail system.

AIRCRAFT RADIO AGREEMENT SOUGHT

DISSATISFACTION with the present radio frequencies reserved for aeronautics was voiced at the conference of aviation-radio engineers held at the Federal Radio Commission in Washington, D. C., on July 17. Many of the present frequencies were reported useless for telephone or telegraph communications over mountainous regions. The conference agreed that efforts would be made at the August 7 meeting to temporarily allocate channels for specific needs.

Herbert Hoover, Jr., radio engineer and eldest son of President Hoover, told the conference that experiments on the West Coast have disclosed that channels above 6,000 kilocycles are not adapted for communications in the Southwest. Mr. Hoover, who is technical assistant to the president of the Western Air Express, Inc., declared that radio waves in the continental short wave band, reserved for aviation, will not follow the contour of the land in mountainous country in the Southwest.

The conference agreed that first the frequencies assigned for aeronautics must be tried and tested to ascertain their adaptability for air to ground communications. Frequencies that are not adapted for communication in certain areas should not be assigned those sections, it was argued. The plan to assign frequencies to particular routes, engineers pointed out, was agreed upon at the March conference, but it was not known then and is not known now just which frequencies should be used.

Tentatively, the conference agreed that the air transportation companies should work out the technical program, and that it is not yet time to specifically allocate the frequencies, but that they shall be employed experimentally.

Lieut. E. K. Jett, U. S. N., short wave engineer of the Commission, suggested that a temporary allocation of the channels be made, with the understanding that it will be changed as additional knowledge is gained by experience. The Chief Engineer of the Commission, Captain Guy Hill, declared that the air transportation companies should endeavor to learn as quickly as possible, just which channels are best suited, so that if changes in frequencies are necessary, they may be effected with the least possible hardship.

In a tabulated statement, Lieutenant Jett pointed out that of the frequencies available for aviation the nine low frequencies have been assigned; 16 of the high frequencies for night communications have been assigned with 33 unassigned, and 13 of the day high frequencies assigned with 19 unassigned.

P. & A. Photo

Mrs. Phoebe Fairgraves Omlie.

Others who attended the conference were Federal Radio Commissioner William D. L. Starbuck, L. D. Seymour, William D. Terrell, H. T. Walls, Eugene Sibley, Commander Frank H. Luckel, Lieut. Commander H. E. Fischer, Lieut. E. E. Stone, and M. M. Eells.

NEW ALTITUDE RECORD FOR WOMEN

MRS. PHOEBE FAIRGRAVES OMLIE of Memphis, Tenn., recently set a new unofficial altitude record for women fliers when she flew her plane to a height of 25,400 feet above the Moline, Ill., airport. Mrs. Omlie was in the air 2 hours 10 minutes, and during the flight drifted westward over Iowa City, Iowa. The attempt was made under the auspices of the National Aeronautic Association.

OFFICIALS of the International Mercantile Marine recently announced that they had entered into an agreement with the Transcontinental Air Transport, Inc., operating the transcontinental air-rail passenger service in conjunction with the Pennsylvania and Santa Fe Railroads, for the booking of passengers on its steamships on the coast-to-coast service. The arrangement would combine the convenience and speed of ships, airplanes, and trains.

This linking of three transportation systems, ship, rail and air, means that passengers will be able to travel from Paris or London to Los Angeles in the fast time of eight days; six of which will be spent on the liners operated by the I. M. M. and two in spanning the continent by the rail and plane connections. Patrons of the International Mercantile Marine's three services, the White Star, Red Star and Atlantic Transport lines, may now make reservations from the company's many European offices, or through the pursers on board the various liners, to points in the Middle West and California.

NEW YORK TO BUENOS AIRES LINE TO OPEN IN DECEMBER

DECEMBER has been set as the month in which regular passenger and air mail service will be in operation between New York City and Buenos Aires, according to a recent announcement by officials of the New York, Rio and Buenos Aires Lines, Inc. Covering an 8,000-mile course with 42 stops in the United States, the Islands of the Caribbean, and South America, the new line will bring Buenos Aires within seven days of New York City. The company's flagship, the *Washington*, left New York recently for an inspection trip of the route.

Although the route covers a distance of 8,000 miles, the planes will not be out of sight of land more than 15 minutes during the entire journey. Seaplanes will be used to negotiate the passage between Miami and Havana. Safety precautions will include a series of radio stations which will form a network over the entire route and will keep planes in continuous communication throughout the journey. Twelve radio stations have already been installed and are ready for operation. Within eight months from the inauguration of the service, the installation of beacons and other equipment for night flying will have been completed. This elimination of the necessity for night stopovers will cut the original flying time almost in half.

The New York, Rio and Buenos Aires Lines, Inc., has already closed contracts with the governments of Argentine and Uruguay to carry mail between those two countries and the United States. Other contracts with a number of South American countries are in negotiation.

THE ALL-GEORGIA AIR TOUR

[By Al Major]

THE "All-Georgia Air Tour" will stop at twenty-one Georgia cities and nine other cities will be circled by the planes. The tour which was to start July 23, covers more than twelve hundred miles and entirely circles Georgia. Major Luke Christopher, from the national headquarters of the National Aeronautic Association, was to be in command of the advance plane, three minutes in front of the first flight. Forty-three cities requested visits from the tour and the general Air Tour committee has met these requests in every instance where it was humanly and mechanically possible. Governor L. G. Hardeman has issued an official proclamation designating the week of the tour as "Georgia Aviation Week." The Atlanta chapter of the N.A.A. was to sponsor a "send-off" dinner to the tour party the night before the day of departure.

SPARTAN

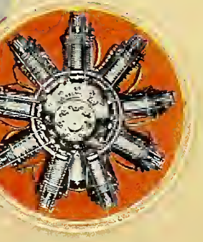
The Spartan C-3 Walter powered with the 120 h.p. Walter Motor

Spartan recognizes four essentials in the manufacture of airplanes which endure. The design must be correct in every detail, materials must be of the highest specifications and workmanship must be perfect. The fourth essential is a motor of proven merit.

Spartan is renowned for its design. Its distribution of surfaces and its aerodynamic proportions place its load constantly at the center of balance so that its tendency at all times is to steady, natural flight. Strength is a part of the Spartan reputation and every Spartan reflects quality of materials and workmanship.

The Spartan C-3 Walter comes from this combination of essentials and from a company which realizes that high standards must be maintained, that last year's performance must be eclipsed and that beauty must be combined with utility.

Put the Spartan to work at any task. Let it be a commercial or pleasure hop. Compare its performance to that of a more expensive plane and you will discover its superior airworthiness and dependability for more consistent and more economical work in the air.

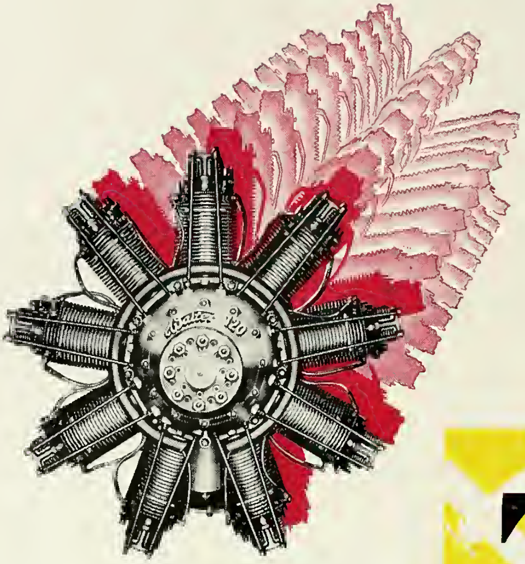


. . . . Literature describing the Spartan powered with the Curtiss-Challenger and the Wright J-6 will be furnished on request.

DESIGNED TO BE SAFE . . . . BUILT TO STAY SAFE

SPARTAN AIRCRAFT COMPANY

TULSA ◂ ◂ OKLAHOMA



A motor of proven merit

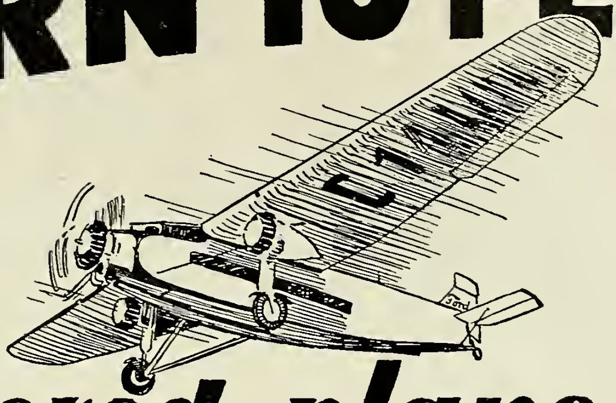
TEST FLIGHTS are ordinarily of small importance except to indicate what changes and improvements should be made in an experimental model of an airplane. But when a manufacturer deliberately puts a proven model in flight with the intention of breaking down its mechanical resistance and for the purpose of discovering the slightest structural weakness, the result of that test should be of interest to those critical of aircraft performance.

Such a test was undergone by a stock model Spartan C-3 Walter recently at the Tulsa Municipal Airport. A Spartan powered with a stock Walter Motor was flown at full throttle more than nine hours daily for seventeen consecutive days. At the end of this flight the Spartan had traveled a total of 13,500 miles—more than half the distance around the earth—but during the entire seventeen days of strenuous motor labor, repairs were neither made nor found necessary. Previous to the flight the motor had already accumulated fifty-eight hours of flying time.

Spartan Aircraft Company is satisfied with those results for they demonstrate inherent stamina and dependability, and that a Spartan powered with a Walter Motor is built to withstand flight conditions that would not fail to reveal any weakness that existed, either in construction or in the balance between plane and motor . . . That is why Spartans in operation along the air lanes of the United States are daily undergoing the same rigorous, punishing treatment in the service of their owners . . . And by the same standards of comparison dealers, distributors, commercial operators and those interested in aircraft for personal business or pleasure have discovered that the Spartan C-3 Walter offers the greatest value in airplane utility.

SPARTAN AIRCRAFT COMPANY
◆ ◆ TULSA, OKLAHOMA ◆ ◆

LEARN TO FLY A Ford Tri-motored plane at the lowest possible cost



THE aviation industry is asking for YOU to come and fill one of the many big-paying executive positions which are now open. Are you going to "pass up" this opportunity to better yourself and get in on the ground floor of this growing business, or are you going to train yourself NOW for a bigger future? You cannot postpone your decision but must make up your mind NOW. Decide to come to the Dale Seitz School of Aeronautics. Let Dale Seitz personally supervise your training.

Learn to fly from one of the Middle West's most prominent flying fields, Fairfax Airport. Learn to fly a Ford Tri-Motored Plane. Our equipment includes such a plane and also new Waco's. We are one of the few schools with this excellent equipment. Your diploma from the Seitz School is your key to opportunity. You are then prepared to fly big or little ships. Your training is COMPLETE. Nothing is left undone in preparing you for a promising future and our prices are extremely reasonable on all courses.

FOR WOMEN, we have obtained the services of Ruth Haviland, the first woman in the State of Kansas to be granted a pilot's license and the official hostess of Fairfax Airport. She will personally supervise the training of women pilots, a new feature, duplicated by no one else.

Opportunity is knocking for you. Decide NOW for a bigger salary and unlimited future. Fill in the coupon below. It will bring you full information. Do it NOW.

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AERONAUTIC TRADE DIVISION, DEPT. OF COM., ESTABLISHED

By Wing Over

NOW that the aeronautics industry of the country has reached the status of a major industry and is confronted with the necessity for finding additional outlets for its production, the Department of Commerce has established an Aeronautics Trade Division, according to a recent announcement by O. P. Hopkins, Acting Director of the U. S. Bureau of Foreign and Domestic Commerce.

The new division is headed by Leighton W. Rogers, formerly United States Commercial Attaché at several European capitals and executive officer of the International Civil Aeronautics Conference held in Washington last December. A major in the Air Corps Reserve, Mr. Rogers has been in charge of the Commerce Department's program in the development of overseas markets for aeronautical products. The new Division, although not a part of the Aeronautics Branch of the Department, being an addition to the commodity divisions of the Bureau of Foreign and Domestic Commerce, will coöperate closely with the aviation regulatory branch under Assistant Secretary of Commerce Wm. P. MacCracken, Jr. The Bureau of Foreign and Domestic Commerce has an organization of foreign offices located in strategic points throughout the world from which reports on economic and trade conditions are constantly being sent to the Commodity and Technical Divisions of the Bureau in Washington. Close touch is maintained with industry by means of the District Offices in the United States as well as the coöperative offices in local chambers of commerce.

Simultaneously with the announcement of the new Division, export figures of aeronautic products were made available for the month of May, which was the peak month for all time since the heavy shipments of military aircraft in 1918 and 1919. The figures just available show that 49 airplanes were exported during May. These reached a valuation of $794,024. Twenty-four aircraft engines at a valuation of $94,315 were exported during the month when aircraft parts and accessory shipments were valued at $189,958. The American airplanes exported have gone to all parts of the world, although the exports of American aircraft are but a small percentage of production. In 1928 only 162 of the 4,300 airplanes produced, or less than 4 per cent, were exported. The ratio of foreign sales to production should be at least 10 per cent, according to officials of the new division, who state that there has been a widespread interest in American aircraft on the part of foreign operators, particularly in Canada, Latin America and the Far East. Even Europe, with its subsidized airlines and aircraft manufacturers, has made some purchases of American aircraft, parts and engines. Japan was recently the country of destination for an appreciable shipment of airplanes for the first time.

The 63 foreign offices of the Bureau and the consulates of the Department of State, used where the Department of Commerce is not represented, are being supplied by the Division with current information on American aeronautic development, aircraft, and operating cost data. These offices located abroad are, in turn, supplying the Division with information on market prospects and foreign airline operations. One section of the Division, headed by Brower V. York, has as its function the compilation and dissemination of data on foreign air transport schedules, rates and operation results, as well as a similar service on foreign air traffic regulations, insurance as applied to aviation, and foreign airports. J. Warren Angle, Jr., will be Assistant Chief of the Foreign Information Section of the new Division.

The Trade Section of the Division, which has Fowler W. Barker as chief, will promote and aid the aeronautic manufacturer in increasing the sale of his products, both abroad and domestically, to avoid wasteful methods of merchandising. Mr. Barker has a background of experience as a commercial and military pilot and in sales work in the aeronautics industry. Courts D. Rea has been appointed to assist Mr. Barker in the aeronautic trade promotion work of the Bureau.

Cardinal Receives Approval Certificate

AN Approved Type Certificate has been issued by the Department of Commerce to the St. Louis Aircraft Corporation, subsidiary of the St. Louis Car Company, covering the Cardinal cabin monoplane. The Cardinal successfully passed the rigid tests on stability, take-off, landing and load carrying.

Following receipt of approval from the Department of Commerce, the production program for the Cardinal became operative, the first ship being delivered to William C. Benton of Culver City, California.

GUGGENHEIM RADIO BEACON TESTS

LIEUT. JAMES DOOLITTLE of the Army Air Corps has been detailed to the Guggenheim Fund for the promotion of Aeronautics to conduct experiments at Mitchel Field, Long Island, N. Y., to learn the dependability of the radio beacon for blind flying. The experiments are expected to reveal to what extent radio beacons of this type can be relied upon to indicate true directions to an aviator, caged in a cockpit and unable to see ground as he attempts a safe landing.

The tests are to start as soon as a radio wave is assigned for the purpose by the Federal Radio Commission. Operating power of two kilowatts, on a wave of 1,034 meters (290 kilocycles), has been requested for the radio station necessary to carry out the program of experimentation.

The visual beacon indicator device includes several small electric lamps installed within sight of the airplane pilot, which light up or remain unlighted, according to the plane's position with reference to the true flying course. A lamp of a certain color indicates deviation to one side of the course and a lamp of another color means deviation to the opposite side. A certain condition of the lamps indicates that the flier is on his true course.

By means of the airplane beacon receiver and the beacon transmitter on the earth which sends out the radio waves fliers are expected to ascertain their true course by vision, as they are now guided by dot-and-dash signals received through headphones. The visual beacon translates the audible signals into visible characters, eliminating the inconvenience of the ear-phones.

For transition from the aural to the visual type of directive radio beacon for guiding airplanes, the Airways Division of the United States Department of Commerce is now constructing seven visual-indicator radio transmitting sets at the shops of the Lighthouse service in Detroit.

UNIVERSITIES TO AID IN TESTS

SIX American universities equipped for research in aeronautical engineering have been selected by the Aeronautical Chamber of Commerce to test commercial airplanes for manufacturers in accordance with a new code on standard performance. The new code will provide manufacturers with a standard basis upon which to compute the speed, rate of climb, ceiling, landing speed and other performance data which characterize the capabilities of their planes.

New York University, University of Michigan, Purdue University, Stanford University, University of Washington and the California Institute of Technology are the six institutions selected to carry on the standard tests. The universities designated will have in readiness at all times the necessary instruments and apparatus for the tests. The manufacturer may ask for any or all of the following tests to be conducted: high speed, climb to 10,000 feet, ceiling, angle of initial climb, length of take-off, time to take-off, length of landing run, landing speed, minimum speed with power on, and minimum speed with power off.

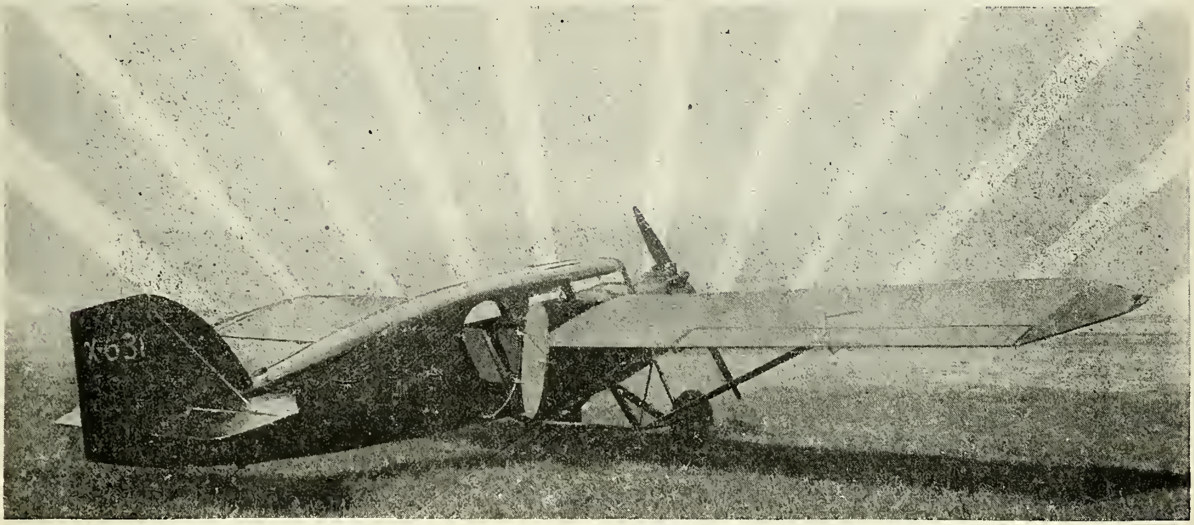
THE Engineering Index for 1928 was announced recently by the American Society of Mechanical Engineers. This index which is published annually by the A. S. M. E., is an encyclopedic bibliography of engineering literature published in periodicals during the year. The index includes the reviews of 1,700 publications.

VERTICAL TUNNEL AT LANGLEY FIELD

THE National Advisory Committee for Aeronautics has announced plans for the construction of a vertical wind tunnel at Langley Field, Va., for the study of the flat spin. The tunnel, which will cost $12,000, will be used to find means of controlling the spin, and, if possible, to find uses for the maneuver.

Invincible

FOUR PLACE CENTER-WING CABIN MONOPLANE



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Backed by exceptional aeronautical skill, resources and equipment, these engineers who believed in the basic principle of the "straight line" labored silently until accomplishment far beyond their expectations drew the public spotlight upon their achievement. Wings are placed in the center of the propeller thrust, giving remarkable performance. A smart ship, with speed, power and superb performance.

Precision workmanship, luxurious flying accommodations with up-to-the-minute instruments and controls, present a remarkably profitable investment for business flying. Powered by a Curtiss Challenger 170 H.P. motor, the "Invincible" develops the first thousand feet climb in fifty seconds, has a cruising range of 700 miles at 120 M. P. H. and a top speed of 142 M.P.H. Completely equipped, $7,800.00 flyaway factory airport. Full details supplied upon request.

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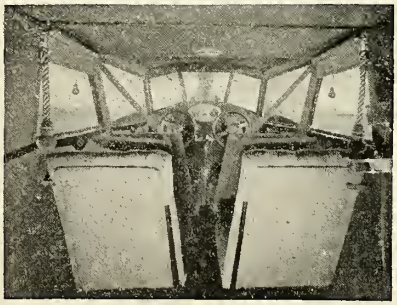
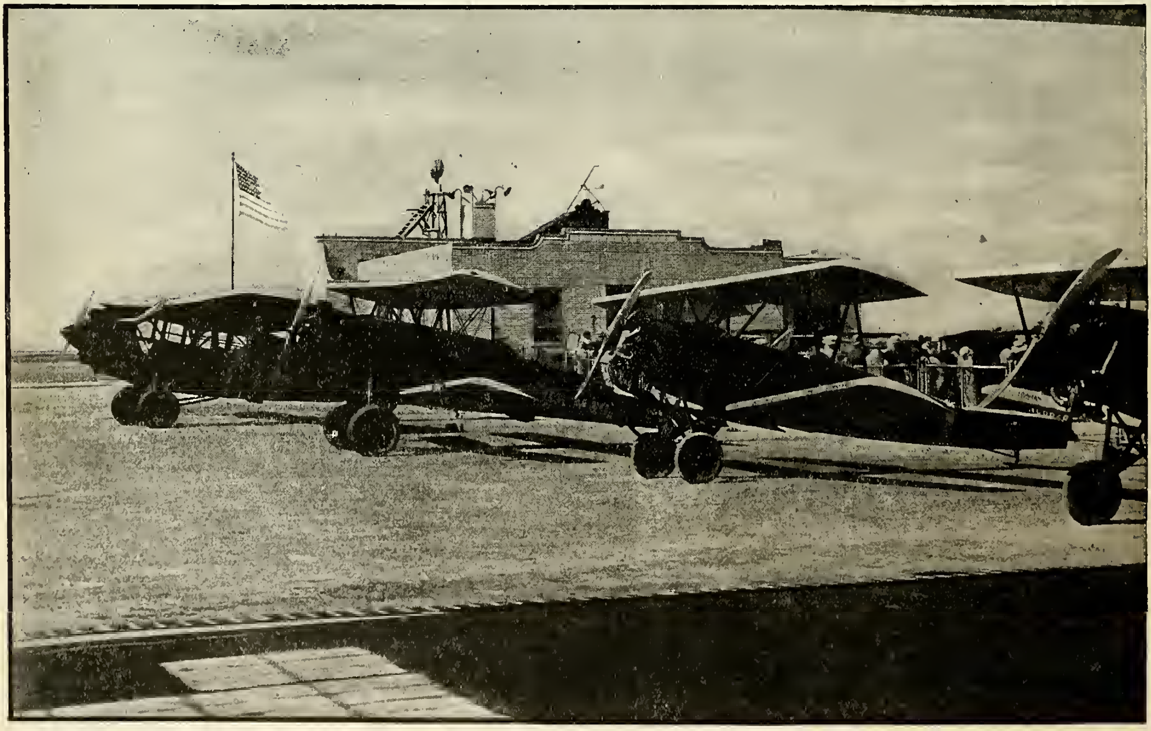


... A FEW MEN

Will See the Future of Aviation and Take Advantage of a Present Opportunity

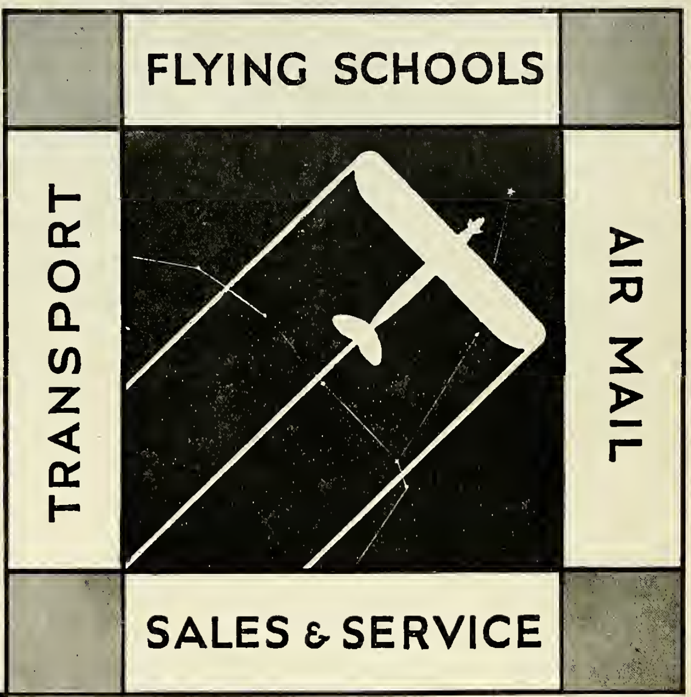
Well located automobile agencies are bought and sold today for many thousands of dollars. When the automobile industry was in the same stage of development as aviation today, it was difficult to convince business men that money could be made in the sale of automobiles. The same situation has been true with the motion picture, radio and other industries which have enjoyed a rapid popular growth ◆ The men with foresight to acquire automobile, radio and motion picture franchises when these industries were in their infancy have developed increasingly profitable businesses ◆ This opportunity exists today in aviation for those men who can see the time when planes will be in general demand for business, for personal transportation, and for sport ◆ To a limited number of men of standing, Colonial Flying Service offers agencies in New York State and New England for the following planes: Fleet—Fairchild—Challenger—Pitcairn—Bird—and Standard ◆ Based on its background of operating experience in air mail—passenger transport—and the maintenance of flying schools, Colonial

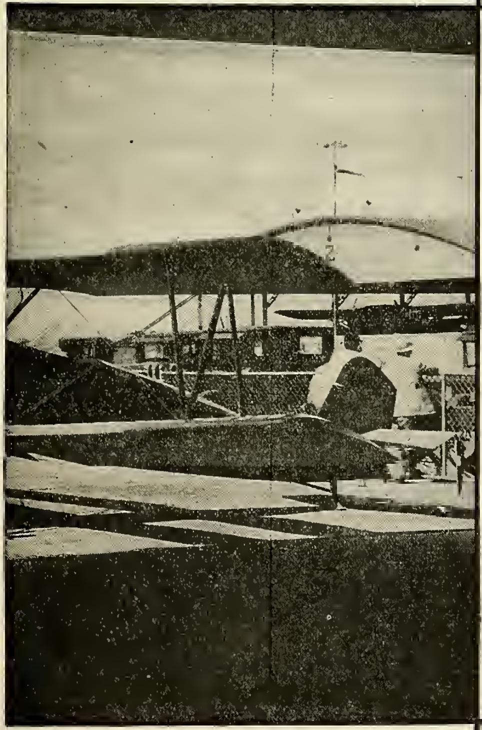


A small part of the Colonial Fleet at the Buffalo Airport, Buffalo, New York

WITH FORESIGHT

is able to advise dealers on all subjects connected with the operation of a profitable sales agency ◆ A Colonial franchise covers not only the ships themselves, but everything pertaining to their operation and maintenance ◆ Colonial agencies for the sale of planes are exclusive. A reasonable amount of capital is required. Affiliation with an established flying field can be arranged ◆ If you are interested in obtaining a Colonial franchise, write us for territories available and conditions for securing an agency.





The Colonial System includes transport routes: New York to Boston—New York to Montreal—Albany to Cleveland—and Buffalo to Toronto ◆ In addition to the cities above, Colonial air mail routes reach Hartford — Schenectady — Utica — Syracuse — Rochester — and Erie ◆ Colonial Flying Schools are being established in the principal cities throughout New York State and New England.

COLONIAL FLYING SERVICE, INC.

270 MADISON AVENUE NEW YORK CITY

District Sales Offices

Boston Buffalo Hartford Schenectady

FLYING INSTRUCTOR LICENSE RULES

TRANSPORT pilots filing application for instructors' licenses, either flying or ground work, will not be approved by the Department of Commerce unless they are actually employed by an approved flying school, according to an announcement of the Department of Commerce.

Officials of the Department announce that transport pilots' licenses are still good for individual instruction. A transport pilot may instruct in flying individually as much as he desires, with full approval of the Department of Commerce and without restriction, but there will be no one-man flying schools licensed, and licensed flying instructors must actually be on the payroll of an approved flying school.

To Test Automatic Sprinklers

A COMMITTEE has been appointed by the Department of Commerce to conduct tests to determine the effectiveness of automatic sprinklers in controlling airplane hangar fires. The group assigned to the consideration of the problem includes Harry H. Blee, chairman, W. S. Garland, R. W. Hendricks, Ira G. Hoagland, Major Frank M. Kennedy, W. Laurence LePage, N. D. Mitchell, H. E. Newell, and Starr Truscott.

PROPOSED BOEING COAST TO COAST LINE

THE United Aircraft and Transport Corporation and the Boeing System have announced plans for a transcontinental air passenger service from New York to San Francisco.

The new coast-to-coast system, which will be formally opened on October 1, will be approximately 3,000 miles in length from New York to San Francisco, all but 400 miles of which is now open to passenger travel. The route from Cleveland to New York will be completed as soon as a New York air terminus has been selected. The New York to San Francisco route will be over a 2,000-mile lighted airway, over which passenger planes will fly both day and night.

RADIO BEACON COURSE-SHIFT INDICATOR

A COURSE-SHIFT indicator has been developed by the Bureau of Standards to check the accuracy of signals sent out by a radio beacon. It indicates to the attendant at the beacon station whether or not the radio beacon course is remaining in a fixed position in space. Without this instrument, if trouble should develop in the radio beacon apparatus, the course might shift without the attendant's knowing it. With the course-shift indicator such a shift is immediately detected and corrected by the attendant.

The course-shift indicator may also be used on aircraft to serve as a course indicator. In this case the pointer of the instrument remains on the center of the scale when the aircraft is on the radio beacon course and moves away from the center of the scale in the direction in which the plane is deviating when it is off the course.

LICENSE STATISTICS

ON June 14 there were 4,317 active aircraft licenses in the United States, and 2,880 identifications, according to a report of the Department of Commerce. Pilots' licenses on that date totaled 6,585 and mechanics licenses 5,673. There were 165 approved aircraft, 25 approved engines, and 28 approved propellers.

Approved Type Airplane Floats

There are ten models of airplane floats approved by the Department of Commerce for use on licensed aircraft. Following is the list of floats giving in order manufacturer's name, model number, number of floats per airplane, and the maximum allowable airplane weight. The use of these floats on any airplane requires a complete investigation and approval of the particular type of installation.

Brewster	B-5500	2	5000
Edo	Type C	2	2580
Edo	De Luxe	2	2660
Edo	Type E-3	2	4100
Edo	Type H	2	1600
Edo	Type J	2	5570
Edo	Type K	2	4880
Fairchild	P-6	2	5470
Hamilton	Series F	2	5230
Hamilton	Series D	2	3840

PRATT AND WHITNEY MECHANICS SCHOOL

TO establish closer service connections with operating companies and airplane manufacturers using Wasp and Hornet engines, the Pratt and Whitney Aircraft Company of Hartford, Connecticut, is conducting a training course for mechanics. Only employees of organizations using Pratt and Whitney equipment are admitted to the course.

The course consists of a thorough two weeks' training on the assembly floor. There are no special classes, a student being put directly on the floor as a new employee. He starts in the tear-down division and, after becoming familiar with the engine, is moved to the assembly line where he progresses to the final assembly. When acquainted with the major operations of assembly, he is allowed to go into specialty work such as checking carburetors, assembling connecting rods and crankshafts, mounting blower drive systems, and work on valve and tappet assemblies and the rear and nosepieces of the crankcase.

During the course no attempt is made at systematized school training, since it is taken for granted that the student has had previous experience with airplane engines and is sufficiently familiar with them to put forward questions on the manufacturing practice.

At the conclusion of the schooling a questionnaire dealing with the work must be filled out. When this is answered to the satisfaction of the Service Department, the course is completed. Before leaving, students are obliged to report to the service manager for a short conference during which they may clear up any questions they have to ask on the engines.

REGULAR WEATHER SERVICE STARTED

A NEW weather reporting and forecasting service for aviators, providing for the collection of weather reports along the New York - San Francisco - Los Angeles transcontinental airway and broadcasting of flying weather reports every three hours day and night, was put into operation recently by the United States Weather Bureau. The service was made possible by an appropriation of $350,000 made by Congress.

The service includes a new net of sixty weather reporting stations covering a strip 400 miles wide along the transcontinental airway. The reports can be picked up by aircraft having suitable receiving sets, as well as by persons on the ground, and are available to everybody interested. They give the general character of the weather, the ceiling or prevailing cloudy type, the visibility, wind direction and velocity, temperature, dew point in some cases, pressure, and any unusual features. A wave length of 315 to 350 kilocycles is used in the broadcasting. The service is expected to be extended eventually to the three great transverse airways along the Atlantic Coast, between Chicago and Texas cities, and along the Pacific Coast.

N. A. C. A. Reports

Tables for Pressure of Air on Coming to Rest from Various Speeds

"TABLES for Pressure of Air on Coming to Rest from Various Speeds" is the title of report No. 316 of the National Advisory Committee for Aeronautics by A. F. Zahm and F. A. Louden. The tables in the report furnish the aeronautical engineer with ready numerical formulas for finding the pressure of air on coming to rest, and give the stop pressures of air for even speed intervals. The report also includes working formulas for several special units of speed.

Collection of Data on Airfoils

REPORT No. 315 of the N. A. C. A. is a collection of data on airfoils made from the reports of aerodynamic laboratories in Europe and America. The information is presented in a uniform series of charts and tables suitable for the use of designing engineers and for purposes of general reference.

The absolute system of coefficients has been used, since the National Advisory Committee for Aeronautics believes that this system is the one most suited for international use, for it is one from which desired transformations can be easily made. For this purpose a set of transformation constants is given. Each airfoil section is given a reference number, and the test data are presented in the form of curves from which the coefficients can be read with sufficient accuracy for designing purposes.

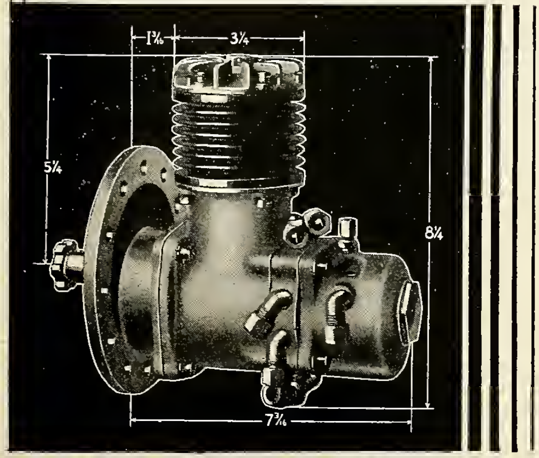
Announcing

SKY SPECIALTIES CORPORATION

manufacturers of the

HEYWOOD STARTER

See our booth Nos. 159 & 160 at the National Aeronautical Exposition at Cleveland, Ohio, Aug. 24 to Sept. 2.



Sky Specialties Corporation, which has just acquired the assets of the Heywood Starter Corporation, has on its directorate some of the most prominent men in the Aeronautical and Motor Car industries in the country.

Arthur L. Cash, formerly President of Northway Motors, is President of the Company, while on the Board are Chas. B. Bohn, President of the Bohn Aluminum & Brass Corporation; William B. Stout, President of Stout Air Services, Inc., and Edward F. Roberts, Vice-President of Production, Packard Motor Car Company.

It is intended to immediately increase production to care for the ever-accelerating demand, and with ample resources of man-power, manufacturing facilities, and finances, the new company is prepared to keep right in the fore in the tremendous growth which this entire industry will experience in the next few years.

SKY SPECIALTIES CORPORATION
3651 Hart Avenue • Detroit, Michigan

CURTISS AND WRIGHT NOW MERGED

THE formation of the Curtiss-Wright Corporation by the merger of the Curtiss, Wright, and Keystone aviation interests was announced on June 26 in New York City. Seven affiliated concerns are included in the combining of the three principal interests. The resulting organization has a capitalization of $70,000,000.

The new company will embrace the Wright company, which manufactures the air-cooled Whirlwind engine, and the Curtiss Aeroplane and Motor Company, which has specialized for many years in the manufacture of water and chemical-cooled engines, in addition to air-cooled engines. The Curtiss-Wright organization will also include the Curtiss Airports Corporation, Curtiss Flying Service, Inc., Curtiss Airplane Export Corporation, Curtiss Caproni Corporation, Curtiss-Robertson Airplane Manufacturing Company, Keystone Aircraft Corporation, Moth Aircraft Co., New York Air Terminals, Inc., and New York and Suburban Air Lines. The new company will be identified with several large transportation systems, including the National Air Transport, operating from New York to Chicago and Dallas; the Pitcairn Lines, from New York to Miami; the Transcontinental Air Transport and the Aviation Corporation of America.

The new company will be practically complete in every line. Its planes will range from the Moth to the Curtiss Condor. The new corporation would also be the largest producer of plane motors in the world, with products ranging from the 80 horsepower Wright Gipsy to the 600 horsepower Curtiss Conqueror. The range of output in engines would comprise water-cooled, radial air-cooled, in-line air-cooled and chemical-cooled motors. C. M. Keys, head of the Curtiss interests, will be president of the new company, and Richard F. Hoyt, chairman of the Wright Aeronautical Corporation, will be the chairman of the board of the Curtiss-Wright Corporation.

SIMPLE AERODYNAMICS AND THE AIRPLANE

By Charles N. Monteith

THE third edition of Charles N. Monteith's "Simple Aerodynamics and the Airplane" was published recently by the Ronald Press Company, New York City, with revisions and additions by Col. C. C. Carter of the United States Military Academy, West Point, N. Y. A complete revision of the work was made to bring it up-to-date in information and methods of presentation.

The presentation is not highly technical, but sound fundamental principles have been developed and applied, and much descriptive matter has been added. There is new material on navigation, radio, and aerial photography. To aid the student a list of questions based on the text is printed at the end of each chapter.

SCHEDULE OF COMING AERONAUTIC EVENTS

August 1-14. French Light Plane Meeting, Orly France.

August 9-11. Aircraft Exposition and Pike's Peak Air Meet, Colorado Springs, Colo., Municipal Airport.

August 15-17. Official Opening of Hensley Field, Grand Prairie, Tex.

August 15. International Balloon Race, Poland.

August 18. Air Races, Akron, Ohio.

August 24-25. Airport Dedication and Air Meet, Big Springs, Texas.

August 24-September 2. National Air Races and Aeronautical Show, Cleveland, Ohio.

August 26-28. Soc. of Automotive Engineers Aeronautic Meeting, Cleveland.

August 31. Air Races, Syracuse, N. Y.

September 2. Altoona, Pa., Air Races.

September 6-7. Schneider Cup Race, over the Solent, Cowes, England.

September 7-15. Aircraft Exhibit of 1929 at Coliseum, Chicago, Ill.

September 9-14. Fair and Air Show, Muskegon, Mich.

September 10-20. Aero Club of France meeting, Le Baule, France.

September 15-21. Aviation Meet, Sioux Falls, So. Dak.

September 15-21. Eastern States Exposition, Springfield, Mass.

September 21-29. International Air Circus of U. S. Army Air Corps Reserve Officers Ass'n., Fairfax Airport, Kansas City, Mo.

September 28. Gordon Bennett Balloon Trophy Race, Laclede Gas Co. property, 8900 South Broadway, St. Louis, Mo.

October 5-21. National Air Tour for The Edsel Ford trophy.

October 12. Air Races, Salem, N. H.

October 12-27. Southwestern Aircraft Exposition, State Fair Grounds, Dallas, Texas.

October 29-November 22. World Engineering Congress, Tokio, Japan.

October 31. Guggenheim Safe Aircraft Competition closes.

December 1-9. International Aeronautical Exposition of the Aeronautical Chamber of Commerce, Chicago, Ill.

INTERNATIONAL AIRPORTS

By Col. Stedman Hanks

INTERNATIONAL AIRPORTS is a book by Colonel Stedman Hanks published recently as a report of his observations on European airports. European airports of the latest design are being constructed as recreation centers and not as mere points of arrival and departure for airplanes, according to Colonel Hanks. He indicates his conviction that the development of airports must follow the path which has been blazed in Europe.

TRADE LITERATURE

"AVIATION as a Business" is the subject of a booklet issued for general distribution by the Union Trust Company of Detroit. The booklet reprints the five prize winning essays in the Union Trust Company's annual scholarship contest.

FLOYD SMITH, inventor of aerial lifesaving devices, has written a booklet entitled "Coming Down" describing the history and nature of parachutes he has invented and produced by the Switlik Manufacturing Company of Trenton, N. J. The booklet describes the Floyd Smith Safety Pack and the Safety Seat for the use of passengers on transport planes.

German Flier World Flight

By Howard V. Waldorf

A NEW recreation for the flying sportsman has been discovered. The only equipment required is a light plane, a couple of dollars for fuel and a lot of time. Then, crank up the plane, and fly around the world. That's all there is to it.

The "Columbus" is Baron Frederich von Koenig-Warthausen, 21-year-old German student flier. When he was graduated from the University of Berlin a year ago, besides the diploma, the baron was the possessor of 10 hours solo flying time, a Klemm-Diemler monoplane, *Kamerad*, powered with a two-cylinder twenty horsepower Mercedes engine, and a desire to see the world. The plane can fly 50 miles on a gallon of gasoline.

The flying nobleman put 40 gallons of fuel in his flivver plane and entered the competition for the von Hindenburg prize, posted for the best sporting flight of the year.

Fourteen hours later, the baron landed at Moscow after a 1,200-mile non-stop flight from Berlin. Word was flashed to him there that he had won the prize, but that didn't stop him. His plans called for returning to Berlin by the other gate. More fuel and *Kamerad* was on the way across Persia. Seven days later the flying baron pulled up at Teheran. He spent a month in seeing the country there. More gas—and he pushed on to Calcutta, Akyab, Rangoon, Bangkok, Singapore, and Hongkong.

From Hongkong, he shipped his plane by boat to Kobe, cranked her up and flew to Tokyo and Yokohama.

Another boat trip, and the baron and *Kamerad* landed in the United States, disembarking at San Francisco, with more than half the long flight completed.

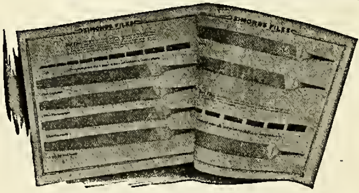
Assembling and tuning his plane up at Alameda Airport, the baron pushed on toward New York, where he plans to take a steamer for England. The tuning up consisted of cleaning the two original spark plugs with which he left Berlin. So far repairs have cost nothing. There have been none needed.

Unfortunately, the baron was severely hurt in an automobile accident while enroute to the El Paso airport to continue his flight.

SIMONDS

for speed cutting—files

with that swift sure, clean cut that speeds up work



The SIMONDS FILE CATALOG
Yours, for the asking

SIMONDS SAW AND STEEL CO.
FITCHBURG, MASS.

EIGHT FACTORIES **SIXTEEN BRANCHES**

TEXAS AERONAUTICAL DEVELOPMENTS

By Capt. W. H. Scott

OVER five million dollars will be spent in Texas during the next few months in an endeavor to increase facilities at various centers, according to estimates being made by chambers of commerce and leading firms interested.

Leaders in this development are the Southern Air Transport, of Fort Worth, Southern Airways, San Antonio, Dallas Aviation School, Curtiss Flying Service, the Mexican Aviation Corporation, and the Art Goebel Flying School, Kansas City.

Over one million dollars will be spent in Fort Worth, where A. P. Barrett, president of the Southern Air Transport, announced that he will build a modern skyscraper for housing all firms in the city conducting aviation businesses. The ground floor will be used by the American Bank and Trust Company, of which he is chairman of the board of directors. The firm has also purchased its own private field which approximately faces the local municipal airport. It will erect its own hangars and administration buildings there.

The largest development, however, is planned for San Antonio, where the company has purchased a large new field and will build a University of the Air. The buildings and field will cost over $1,000,000, it is estimated, and will be the largest of its kind in the world. Three other airports have been leased or purchased by the same company.

The University of the Air will take care of the training of over 1,000 students with over 100 airplanes in use for instruction. Large shops for maintenance under the Texas Aero-Motive corporation will be built for students wishing to learn aero engineering and designing. Other training will include aviation business administration.

Southern Airways at San Antonio will have five hangars in use at the old Stinson Field. Judge L. R. Winship, president of the company, said he expected 500 students from the Latin countries as a result of his recent tour through Central and South America. This firm has also purchased 40 acres adjoining the field, where it will erect shops, sleeping quarters and administration buildings.

Close to this field will be the field recently acquired by Art Goebel that will be used as one of a chain of flying schools to be created in the South. Goebel will build his own hangars and will select his pilots from well-known Army instructors.

Other plans also call for a field to be used by the Curtiss Flying Service. Casey Jones recently closed a deal for several hundred acres of ground upon which operation will be commenced almost immediately.

Final details have been cleared up by the city of San Antonio in the purchase of 2,000 acres of land that will be used by the Government in the building of the West Point of the air. Leading Army officers at Brooks and Kelly Fields stated that federal appropriations of money for building the barracks, draining and equipping the field, will be made this year and that the field will be in operation by 1930. This school will be the greatest military aviation center in the world, it is claimed.

Three airplane manufacturing plants are expected to locate in Dallas within the next few months, according to Major Laird, aviation secretary of the Dallas Chamber of Commerce, who forecasts that the three principal cities in Texas—Dallas, San Antonio and Fort Worth—will fight a bitter battle for leadership in the state. There are twelve hangars at present at Love Field and the building of a new one by a local corporation will be started immediately. Capt. W. F. Long will build another. Martin Weiss, aviation enthusiast, recently stated that he will build two or three more as needed. Mr. Weiss owns three of the largest hangars at Love Field and has land enough to build several more.

Further the Dallas Chamber of Commerce has formed a company for building another steel and concrete hangar. Bids for the building of this hangar have been asked, and it is hoped that building will commence in October.

Capt. Bill Long announced that he will build a set of military style barracks for students of the Dallas Aviation School at Love Field. C. E. Harmon will lease the six-story hotel that will be built facing the field by the Love Field Development Company. This hotel will contain 100 rooms, the lower floors being used as a cafe, lounge rooms. There will be a dance hall on the roof. A modern motion picture house will also be built.

Down in the Rio Grande Valley of Texas, Brownsville will complete the draining of further property to complete the 640-acre field. During a recent heavy rain some irrigation rivers overflowed onto the port, placing it out of commission for several days. This situation hampered international traffic to such an extent that several companies declared they would leave the port. Dikes are now being built around the port.

At McAllen, J. A. Frisby, president of the chamber of commerce, announced the purchase of 100 acres of land in the center of the city to be used as an airport. This airport will be within three blocks of the downtown district and within three minutes of main line railways, hotels and business centers.

Many smaller airports are being planned in centers where early crops are gathered. At these centers crops will be loaded on planes for delivery at McAllen, where the produce will be shipped out in larger ships.

Wright Design Awards

THE awards of the Wright Aeronautical Corporation prizes for airplane design were awarded to three students in the Daniel Guggenheim School of Aeronautics, New York University. The winners of the Wright award were August Zinsser, Jr., C. H. Showalter, and Wellwood E. Beall. All of the designs were for high-wing monoplanes built around Wright engines. Mr. Beall's design was for a cabin plane with Handley-Page slots and flaps.

Judges of the competition were Captain E. L. Land, C. T. Porter, and Grover Loening.

NEW YORK

THE Prest-O-Lite Company, Inc., recently purchased two new acetylene gas plants located at Wichita, Kansas and at Youngstown. Ohio. These plants will supply local industry with dissolved acetylene for oxy-acetylene welding and cutting.

AN average of twenty passengers a day have been carried between New York and Boston during the first three months of operation of Colonial Air Transport's passenger service. Since April 15, when the service was started, 1,894 people have made the trip between the two cities. Passengers from New York slightly outnumber those making the trip from Boston; from June 15 to July 15, 318 persons took the plane from that city as compared with 305 leaving Boston.

THE General Airplanes Corporation of Buffalo, N. Y., is to start production immediately on four new models, in addition to its present output of Aristocrat three-place, cabin monoplanes, according to an announcement of C. S. Rieman, president. The new types to be placed in production are: a new model of the present Aristocrat equipped with a 165 horsepower engine, with the option of greater power up to 225 horsepower; a two-place training plane of the open-cockpit type; a three-place, open-cockpit sport plane; and an open-cockpit plane for carrying small cargoes of mail and express on "feeder" lines.

Production schedules of the General Airplanes Corporation calls for the manufacture by December 1, 1930, of 520 Aristocrat three-place, cabin monoplanes; thirty photographic Surveyor planes; and thirty mail planes, according to the statement made by Mr. Rieman. The company is prepared to double present production facilities of from two to three planes per week on all Aristocrat models. Manufacturing facilities have been perfected on all plane models so that tools, jigs and dies enable the company to make parts interchangeable.

THE Second Annual New York Aviation Show, staged by Aviators' Post No. 743 of the American Legion, will be held in the Grand Central Palace, New York City from February 7 to 15, 1930, according to a recent announcement of the American Legion Post.

SINCE the Aeronautical Chamber of Commerce of America, Inc., became a service organization in 1928, it has grown in membership from 244 to 808, according to a recent announcement of officials of the group. The report of the chamber summarized the work of the body in regard to

(*Continued on next page*)

$3,000.00 Cash Prizes

For Licensed Pilots, Mechanics and Students

AVIATION
DEEP-ROCK
PRODUCTS

THE SHAFFER OIL AND REFINING COMPANY will pay Three Thousand Dollars ($3,000.00) in cash prizes for the best trade name suggested, identifying its Aviation Gasoline and Lubricating Oils.

Only licensed pilots, licensed mechanics, and students are eligible.

The contest closes October 15th, 1929.

In the event of two or more persons suggesting the same best trade name, second best trade name, etc., each will receive the full amount of the prize called for.

The judges of the contest are men who are prominently associated with the development of Aviation:

F. B. Rentschler, *Pratt & Whitney Aircraft Company—Aircraft Motors*
C. S. ("Casey") Jones, *Curtiss Flying Service, Inc.—Aircraft Sales, Service and Schools*
Paul Henderson, *Transcontinental Air Transport, Inc.—Air Transportation*
Charles Lawrence, *Wright Aeronautical Corporation—Aircraft Motors*
Reed Landis, *Reed G. Landis Company—General Advertising*

Full particulars and entry blanks will be mailed upon request—address: Contest Committee,

BYLLESBY SHAFFER OIL AND REFINING COMPANY PIONEERS IN PUBLIC SERVICE

SHAFFER
OIL and REFINING COMPANY
Aircraft Division, 300 West Adams Street, Chicago

A hangar of the General Aviation Company at the Amboy (Syracuse, N. Y.) Airport

(*New York News Continued*)

export, manufacturers' directory, Department of Commerce requirements, accounting, helium supply, airports and airways, aircraft sales, and legal problems.

The report said that the phenomenal growth of aviation during the last six months has boosted the routine work of the chamber to more than five times its former volume. The chamber's library, considered one of the most extensive in the world, devoted exclusively to aeronautics, has grown to include 138 periodical publications on aeronautics; 725 catalogued books; 57,750 pamphlets; 3,000 photographs and 150 maps. More than 1,000 articles on aeronautics in current magazines were indexed by the library during the last six months, and hundreds of librarians and statisticians supplied with the library bulletin.

MAJOR GENERAL JOHN F. O'RYAN has been re-elected chairman of the board of directors of the American Airports Corporation. General O'Ryan is also president of the Colonial Airways Corporation, vice president of the Aviation Corporation and president of the American Motorless Aviation Corporation. General Lincoln C. Andrews is one of four new members of the board of directors of the corporation, which acts as consultant to towns or business firms for engineering problems in airport construction, or for construction, financing or operation of landing fields. Other new members of the board are Carl C. Conway, Norbert A. McKenna, and Malcolm R. White, president of the American Airports Corporation.

TEN-MINUTE speed boat service was inaugurated recently between Forty-second Street, New York City, and the North Beach Airport operated by New York Air Terminals, Inc., at North Beach, L. I. on Long Island Sound. A speed-boat loading dock has been completed at the airport. The 75-foot ramp for the use of amphibions and seaplanes, which was recently completed has been found inadequate for the port's traffic, according to Capt. Thomas King, manager of the port. More ramps are planned.

North Beach Airport is used as a base by Curtiss Flying Service, New York and Suburban Air Lines, Inc., and the Airvia Transportation Corporation which inaugurated its New York-Boston service on July 15, using double-hulled Savoia-Marchetti flying boats. The Curtiss Flying Service operates its New York-Atlantic City passenger service from North Beach, using Sikorsky amphibions.

Under the supervision of Capt. King, the airport includes 250 acres along the beach of Long Island. A large apron extends from the ramp now in use to the administration building and to a hangar now under construction. This hangar will be built of brick and steel and will measure 120 feet by 120 feet. The administration building includes a restaurant and screened porch where diners may watch the planes taking off and landing. A high wire fence completely surrounds the airport.

JAMES D. LACEY and Company and Fairchild Aerial Surveys, Inc., have announced a joint aerial service under a co-operative arrangement by which aerial surveys are made available through the offices and representatives of the two companies in all forest regions, both domestic and foreign. The service includes aerial photography and sketching, mosaics and obliques, forest mapping and reconnaissance, line and contour maps and combined air and ground surveys.

THE Long Island Aviation Country Club was opened recently at Hicksville on Long Island. The new flying club is the first in this country with its own clubhouse, hangar and field. It is one of 114 such organizations now being formed under the national plan of Aviation Country Clubs, Inc.

The new flying country club is located on ninety acres of level turfed land three miles from Hicksville on the Motor Parkway.

THE Irving Air Chute Company recently received a contract from the Army Air Corps for 1140 parachutes, according to an announcement of Colonel T. J. Campbell, president of the company.

FROM 500 to 1,000 truckloads of dirt from the subways is being dumped daily at Holmes Airport, Jackson Heights, L. I., in the filling in of the airport. One hangar is completed at the field, and another is under construction.

THE American Aeronautical Corporation has leased an additional 48,000 square feet at its temporary factory at Whitestone, Long Island. This was done to speed up production on the three types of seaplanes and amphibions pending the completion of the permanent factory and airport at Port Washington, Long Island.

FREDERICK B. RENTSCHLER, president of the Aeronautical Chamber of Commerce of America, recently announced the selection of seven members of a committee of nine pilots to study flying school problems in the United States. The seven men named on the new committee are: Tex Rankin, C. S. (Casey) Jones. John Bowers, Cloyd Clevenger, W. D. Haviland, Oliver L. Parks, and Chan C. Mason.

HARRY F. GUGGENHEIM and Robert P. Lamont spoke over the radio recently on the program of talks about aviation sponsored by the National Broadcasting Company and the Aeronautical Chamber of Commerce.

CONSTRUCTION work has been started on a new wing to be added to the plant of the Pioneer Instrument Company in Brooklyn, N. Y. With completion early next winter of the new unit, the factory will be increased to nearly 60,000 square feet from its present area of 42,000 feet.

"HAPPY LANDINGS", a Visuagraphic motion picture production sponsored by the Irving Air Chute Co. of Buffalo, showing the actions of parachutes in the air, was shown at the 55th Street Playhouse in New York City from July 13 to 19.

THE New York Aircraft Show will be held by the Aeronautical Chamber of Commerce in Madison Square Garden, May 3rd to 10th, inclusive, 1930, according to an announcement by officials of the Aeronautical Chamber of Commerce.

ORDERS for aircraft instruments amounting to over $63,000 were received recently by the Consolidated Instrument Company of America, Inc., according to an announcement made by Joseph Leopold, president. The orders came from Command-Aire, Inc., and the American Eagle Aircraft Corporation.

CENTRAL NEW YORK

[MILDRED MARVIN]

MR. BREWSTER, of Empire Air Transportation, Inc., announced recently that property had been leased opposite the airport on the Amboy-Belle Isle road. The lease gives Empire about 100 acres from which to operate if it is found more convenient than taxying planes across the highway onto the municipal Amboy field. The leased land makes possible a 3,200 foot east and west runway on the Empire property. Northwest and northeast runways of 2,700 feet will be constructed.

Gwynn W. Hoyt, general manager of General Aviation Company, recently announced that that company had taken over the operation and management of the Finger Lakes Airport at Geneva. Mr. Hoyt also announced the appointment of Stuart Jones

(*Continued on next page*)

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(New York News continued)

as manager of the Finger Lakes Field and of the general office in Geneva. George Freeman, a Syracuse pilot, who also belongs to the staff of General Aviation Company, was named chief pilot in charge of operations in Geneva.

AT least one Syracuse boy is taking part in what is known as one of the greatest sports in the world—gliding. He is Herlbut Smith Lavier, 14-year-old son of Mr. and Mrs. Harry E. Lavier. He has constructed a glider with a wing spread of 20 feet and a length of 12 feet. It is made of white pine and spruce, with the wings and fuselage covered with linen.

CHARLES S. RUSSELL, construction engineer for the Curtiss Flying Service, was in Syracuse recently to complete plans for the new $75,000 hangar to be built by the Curtiss Company at the municipal airport. Construction work will probably get under way soon.

ANNOUNCEMENT was made recently by R. M. Brewster of Brewster and Braddock Construction Company of Columbus, Ohio, holder of the contract for installation of lighting equipment along the 300 mile airway between Albany and Buffalo through Syracuse, that the lighting would probably be completed by September 1st. Crouse-Hinds beacons and lights are being used on the Albany-Buffalo route, Mr. Brewster said. Sites for beacon towers and emergency fields between Albany and Jordan already have been graded by gangs of men under Mr. Brewster, and the gangs are working westward from Jordan to Buffalo now. Twenty-two beacons will be erected between Albany and Buffalo, and five emergency landing fields will be lighted under the Department of Commerce contract. The beacons will be of 2,000,000 candle-power each and they will be placed about 10 miles apart. At two of the five emergency landing fields two beacons will be erected. Newark and Little Falls will each have two beacons. Locally established or emergency landing fields will all be lighted and will be located about 50 miles apart over the route.

The emergency fields will be lighted at Fonda, Little Falls, Conastata, Newark, and Batavia. Locally established fields already lighted are located at Albany, Schenectady, Syracuse, Utica and Rochester. The Fonda field makes possible on emergency landing between Utica and Syracuse, the Newark field between Syracuse and Rochester, and the Batavia field between Rochester and Buffalo.

The beacon sites and the height of the towers are as follows: Pattersonville, 87 feet; Connersville, 62 feet; Fonda, 51 feet; Hallsville, 62 feet; Little Falls, 51 feet; Herkimer, 51 feet; Verona Station, 51 feet; Conastata, 51 feet; Minoa, 51 feet; Jordan, 62 feet; Savannah, 62 feet; Clyde, 51 feet; Newark, 51 feet; Woolworth, 51 feet; Fairport, 51 feet; North Chili, 51 feet; Bergen, 51 feet; Batavia, 51 feet; East Pembroke, 75 feet, and Akron, 62 feet.

FIFTY Fleet training and sport planes, valued at $275,000 have been purchased by Colonial Flying Services, Inc., from the Fleet Aircraft Corporation of Buffalo it was announced recently. The ships will be equipped with Kinner and Warner engines. The Fleet planes will be used for primary instruction by the Colonial schools already in operation in Buffalo, Schenectady and Utica and in the other school centers to be organized soon.

THE Central Adirondacks Hotel Association has completed plans for an airport on the road between Fourth Lake and Big Moose. A heavily wooded area containing 52 acres of level land will be cleared for the airport. The field will have two runways of approximately 2,000 feet each, one running southeast and northwest, the other almost due north and south. It is expected that the field will be ready for use late in the summer of 1930.

MISS DOROTHY MARTIN is Syracuse's first airplane saleswoman. She is employed by Hayes Aviation, Inc. Her territory includes all of New York State for the sale of American Eagle planes. She is also a pilot, having 50 hours to her credit.

PLANS are completed for the complete lighting of the Empire Air Transport Airport at Amboy. The system will include a rotating beacon, boundary and obstruction lights, ceiling and flood lights.

R. LELOND KINCAID is the new manager of the Amboy (Syracuse) municipal airport. He succeeds Gordon K. Hood, first manager of the field, who resigned to devote his full time as general manager of the Syracuse branch of Curtiss Flying Service, Inc. Mr. Kincaid earned his wings at Kelley Field, San Antonio, Texas.

NEW JERSEY

NEWARK MUNICIPAL AIRPORT at Newark, N. J., has completed its north-south runway for 3,500 feet, and smoothing of the soil surface of the port is being hastened for completion by fall. Long runways are to be completed in the southwest-northeast and northwest-southeast directions with a circular paved area at the intersection.

Companies now using Newark airport as a base include Colonial Canadian and Colonial Western Airways, flying passenger schedules to Montreal and Boston; Newark Air Service, giving sightseeing and instruction flights; Eastern Aeronautical Service conducting sightseeing, sales, service, and training activities; Standard Oil Service, flying in the interests of the Standard Oil Co. of N. J.; Pitcairn Aviation, Inc., and National Air Transport, flying air mail over the southern and transcontinental routes; United States Air Transport flying the Airline to Washington, D. C., and the local aviation unit of the New Jersey National Guard. Flight Interstate, Inc., was formed recently to conduct passenger service from the Newark Municipal field to Asbury Park, N. J. Two flights were to be made daily, starting the last of July. Bellanca planes are used.

The National Guard unit on the field has completed its brick and steel building which is to be used as headquarters for its aeronautic activities. The Colonial organization has started construction on a hangar to house the Ford and Fairchild planes used in its airlines from the field. Because of the nearness of Newark Airport to steamship docks, five Ford trimotor transports for use by the Pan American passenger and mail lines were recently flown to the airport, dismantled and crated, and hauled across the field to the steamer for South America. This plan saved the cost of railroad shipment.

MAJOR R. L. COPSEY has been appointed general manager of the Newark Air Service of Newark, N. J., according to an announcement of Captain John O. Donaldson, head of the service. Major Copsey was formerly an aeronautical inspector in the metropolitan area for the Department of Commerce.

THE last J-5 Whirlwind engine was assembled recently at the plant of the Wright Aeronautical Corporation in Paterson with the inauguration of the Wright J-6 series. Production began at once on the seven-cylinder engine of the new J-6 series, which develops slightly more power than the J-5 nine-cylinder and weighs less. Ninety-five per cent of the parts of the new Whirlwind Seven are interchangeable with the five-cylinder and nine-cylinder models of the J-6 series.

With the initial production of the Whirlwind J-6 series of airplane engines, officers of the Wright Aeronautical Corporation announced the official titles of the new series to avoid confusion in nomenclature. The five-cylinder engine of the series, producing 165 horsepower, is the Whirlwind Five; the seven-cylinder, 225 horsepower, is known as the Whirlwind Seven, and the Whirlwind Nine is a 300 horsepower, nine-cylinder power plant.

CHARLES HEALY DAY, vice president and chief engineer of New Standard Aircraft Corporation of Paterson, N. J., sailed for Europe recently.

Mr. Day's visit abroad is for the purpose of studying European design and engineering practice, especially as applied to large transport planes.

H. G. PRALL has joined the sales department of the American Cirrus Engine Company of Belleville, N. J. Mr. Prall was formerly connected with the engine sales division of the Wright Aeronautical Corporation.

MR. G. LaRUE MASTERS has been made sales manager of the National Lock Washer Company, Newark, manufacturers of Kantlink spring washers for general industries.

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CONNECTICUT

[RUTH W. HAMMEL]

TO commemorate the third anniversary of the establishment of contract Air Mail Route No. 1, the Colonial Air Transport, Inc., operators of the line stopping at Hartford on the Boston-New York route, arranged special cachets for each day in the first week of July. The sending of the cachets on the second day was sponsored by the Hartford chamber of commerce, which mailed letters of greeting to more than 100 cities having air mail stations.

AN article which has created widespread interest appears in the July issue of *ConMuTopics*—the monthly publication of the Connecticut Mutual Life Insurance Company. It is written by Dr. Wm. B. Smith who is assistant medical examiner for that company and also Flight Surgeon for the Connecticut State Department of Aviation.

THE new Wasp-powered Vought Corsair recently purchased by the Connecticut State Department of Aviation arrived at Brainard Field about July 1. The color is dark blue with darker blue cowling and cream colored trimming and the state seal is now being painted on it. Captain Clarence M. Knox, State Aviation Commissioner, is thoroughly satisfied with the performance of the new ship and feels that it will fill a long-felt need in expediting the work of his department, not only in transporting the inspectors to the various fields about the state, but also in gaining more effective control of ships while in the air than was possible through policing from the ground.

A NEW Stinson-Detroiter Junior has recently been bought by the Diamond Film Corporation of New Haven, Connecticut, to be used in aerial photography work.

DISTRIBUTORS for the Whittelsey Avian light biplane have been appointed in Pennsylvania, Ohio and California by the Whittelsey Manufacturing Company of Bridgeport. The appointments are as follows: Ludington-Philadelphia Flying Service, Inc., for Camden and Philadelphia; Wilkes-Barre Wyoming Valley Airport Company for five counties of northeastern Pennsylvania; Main Aeronautics Company for Pittsburgh; C. H. Quackenbush of Cleveland, for Ohio; Earle Lansing Jones of San Francisco for the West Coast north of Bakersville, Calif.; and Russell W. Simpson of Los Angeles for Southern California.

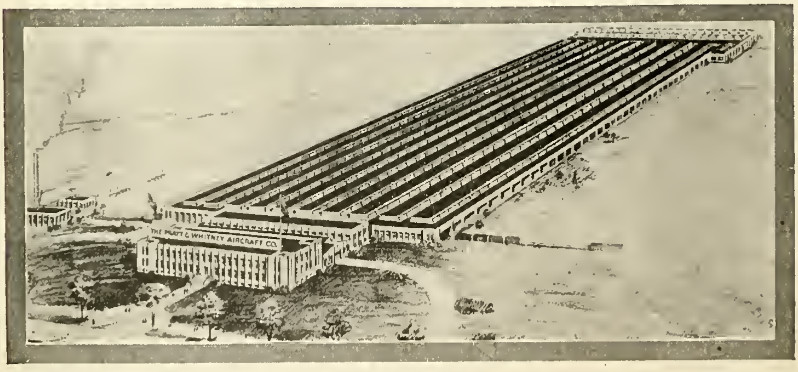
New Plant for Pratt and Whitney

CONSTRUCTION of the new $2,000,000 plant of the Pratt and Whitney Aircraft Company, at East Hartford, Conn., will start soon according to officials of the company. The entire unit, made necessary by the demand for the Wasp and Hornet aircraft engines, will be 400 feet wide, 1,500 feet long, and will contain a total floor area of 500,000 square feet. It will consist of a two-story administration building, a personnel building, an engineering building where experimental work will be carried on, a garage, a power house and the main manufacturing unit. Construction will be of brick, concrete and steel.

Sufficient land of the 600 acres recently acquired has been set aside so that the new plant can be increased to five times its original size. The monitor type of factory construction will be employed. A 400-acre airport and flying field will be developed immediately back of the plant after construction is completed. The company will retain its hangar at Brainard Field. Production of engines will be increased fifty per cent.

JOHN CARISI has joined the Commercial Aircraft Company of America, Inc., Bridgeport, Conn., as vice president and factory manager. Mr. Carisi is organizing an operations force for the manufacturing activities of the Commercial Aircraft firm. Joseph Cubelli, ex-State senator, is president of the concern.

THE Bridgeport Airport, operated by the Curtiss Flying Service, was formally dedicated and opened by a two-day air meet on July 5 and 6. Races, a bomb-dropping contest, parades, parachute jumps, and passenger carrying were included in the aerial program. Governor Trumbull delivered the dedicatory address.


THE PRATT & WHITNEY AIRCRAFT CO.

Sketch of the new Pratt and Whitney airplane engine factory at Hartford, Conn.

AIR SALES, INC., of Boston, has been appointed New England distributor of the Whittelsey-Avian built by the Whittelsey Manufacturing Company, of Bridgeport, Conn. The new distributing organization, headed by R. F. Raymond, Jr., and G. Bruce Stuart, will cover the territory including Maine, New Hampshire, Rhode Island and that portion of Massachusetts east of the Connecticut River.

THE L. and H. Aircraft Corporation of Hartford, Conn., has been joined to the chain of flying schools operated by the Colonial Flying Service.

In addition to the Hartford School, the Colonial service is operating at Buffalo, Rochester and Utica. The Hartford company will keep its present officers and identity, but its pilots will instruct for Colonial. Charles B. Beach is president of the L. and H. company. Major William F. Ladd, commanding officer of the 43rd Division Air Squadron, is vice president; Major Thomas W. Campbell, U. S. A. retired, is secretary, and Goodwin B. Beach is treasurer. Members of the board of directors, in addition to the officers, are: Gov. John H. Trumbull, former State Senator Edward N. Allen, Philip C. Steiger and Dr. William B. Smith.

MASSACHUSETTS

THE City Council of Boston recently passed a loan order for an additional $200,000 for the Boston airport, bringing the total appropriated since September, 1928, to $575,000. This new appropriation will be available for the construction of seaplane facilities and for further extension of the landing area.

The administration and control buildings now under construction at the Boston airport will include the various allotments of space recommended by the Department of Commerce. The main entrance to the building will be from a boulevard approach which will be treated as a parkway. From the vestibule a wide corridor leads directly to the general waiting room, which is 42 feet long by 25 feet wide. This waiting room will have an exit to the flying field. All possible space on the field side of the waiting room will be fitted with double casement windows so that ample opportunity will be afforded to the waiting passengers to observe the activity on the entire field. The waiting room will be furnished with comfortable sofas, chairs, reading lamps and other equipment so as to produce the effect of a lounge.

Off the waiting room will be the general lunchroom, accommodating over fifty persons. Nearly all the tables will command a view of the entire flying field through windows similar to those in the waiting room. This lunchroom counter will be reached by a separate entrance on the side of the building.

Provision is made off the main vestibule for a telegraph room and opposite it a switchboard and desk for general information. There will also be a news-stand and

(*Continued on next page*)

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(*Massachusetts News continued*)

ticket office adjacent to the general waiting room. On the ground floor will be a post-office air mail workroom, emergency or first-aid room, offices for federal, health and immigration officials, pilots' conference room, pay telephones, etc. There will also be a one-story garage housing an ambulance, chemical engine, motorcycles, trucks, meter vaults for the electric service, and the boiler room.

In the second story will be the airport manager's room, a meteorological room, communications room, offices for the federal and state inspectors of aviation, private suite for visiting woman pilots, bedrooms and baths for visiting men pilots, and a room for the physical examination of pilots. Over the manager's office will be the control tower which commands a complete view of the entire field and the front of all the hangars. The exterior walls will consist almost entirely of windows, and outside there will be a balcony for observers. The front portico will be entitled "Memorial Portico" and is designed with some elaboration as a memorial to the New England pilots who lost their lives during the World War.

THE American Motorless Aviation Corporation, which is the sales representative in the United States of the Rhoen-Rossitten Corporation of Germany, is conducting a glider school at Cape Cod, Mass. Junior courses are given for boys 14 to 17 years old, and senior courses are conducted for men. A, B and C ratings are given, and a glider pilot's license is granted upon qualification for the C rating. A pilot must have made a five-minute soaring flight, and passed the ground courses.

THE Boston Chamber of Commerce has formed an aviation bureau to enlarge the scope of its aeronautical activities. Theodore G. Holcombe will be in charge of the new bureau.

THE Boston Chapter of the National Aeronautic Association sponsored its first air meet on July 18 when a program of contests and races was staged at the Boston Airport. This was one of the meets planned by the organization.

MARYLAND

THE Maryland Airport Corporation was formed recently to develop and operate the new Cumberland Airport, 8 miles southwest of Cumberland, Md., on the new McMullen Boulevard. The new field of 100 acres was developed by the Airport Development and Construction Company of Philadelphia. Four gasoline pumps have been installed on the field proper, oil facilities and mechanics are available, and the construction of a large administration building and lunch room has been completed.

TWENTY-FOUR hour production has accompanied a building program to treble the capacity of the Hagerstown, Maryland, plant of the Kreider-Reisner Aircraft Company.

The new building is a daylight structure of steel sash and cement. Additional floor space provided by the new building will add 32,000 square feet to the production area, making a total of 53,000 square feet devoted to the making of Fairchild KR planes. The building layout affords straight line production methods with a minimum of handling of uncovered wings and parts subject to shop wear. Wherever any parts are moved proper carriers are available.

New manufacturing methods have been incorporated in the plant. The punch press has superseded the nibbler, and eliminates the danger of errors in human skill. Wing beams also are routed by a process wholly mechanical. Airfoil nose ribs are formed mechanically at a single stroke.

RHODE ISLAND

NEWPORT AIR TRANSPORT, INC., has been appointed dealer for planes of the New Standard Aircraft Corporation, Paterson, N. J., for the state of Rhode Island and the Cape Cod section of Massachusetts.

State Airport Site Selected

THE Rhode Island State Airport Commission on July 2d took a definite step toward the actual establishment of a state airport by voting to take by condemnation a tract of land exceeding 350 acres in area adjacent to the city of Providence as the site for a state-owned airport.

At the last session of the General Assembly, an airport commission of five members was authorized and later appointed by Governor Norman S. Case with authority to expend the proceeds of a $300,000 bond issue voted at the last state election for the building of a state airport.

The site unanimously selected by the commission lies approximately seven miles from the center of the city of Providence and is reached by three main arteries; namely, Elmwood Avenue, together with the main Post Road, so-called, which is a splendid four-way road, Warwick Avenue, and the Narragansett Parkway.

The services of Black and Bigelow, well-known airport engineers of New York City, were secured and extracts from their report after inspection of the site selected are of interest.

Black and Bigelow's report describes the site as "rectangular with dimensions of approximately 4,500 feet east and west and 3,500 feet north and south. It is almost entirely on top of a plateau averaging about 40 feet above sea level and provides a consistently flat surface which drops off rather sharply on the eastern edge. . . . . The site is ideally situated in regard to accessibility from the center of the city of Providence, and the Shore Line Division of the New York, New Haven & Hartford Railroad passes to the west of the site within one-half mile.

"There is ample space to prepare an 'all-over' field with runways in all directions with a minimum length of 3,000 feet.

"With proper planning, it is believed that this site can be developed into one of the largest and safest airports in New England, one of the most accessible to the center it serves."

The commission is of the opinion that the cost of the land selected will not exceed $100,000, which would leave $200,000 available of the funds at its disposal for the actual building of the port, including the initial hangar, lighting and other facilities required, and it is the purpose of the commission to proceed with the actual construction work at once.

In the commission's statement in selecting its present site, it intimates an intention to recommend to the next General Assembly the location of a seaplane base on state-owned property now controlled by the Metropolitan Park Commission, which land has a very considerable frontage on Narragansett Bay approximately four miles from Providence.

[THOMAS F. BRESNAHAN]

A NEW airplane manufacturing concern has been formed by a group of Boston and New York capitalists and is to be known as the Eastern Aircraft Corporation. It is headed by R. C. Van Arsdale of Boston and will locate in Pawtucket. The new firm has purchased the plant of the Pressed Metal Company, manufacturer of metal toys, but recently busy making parts for the Fairchild Airplane Manufacturing Corporation. The company will manufacture a German designed all-metal monoplane, the production of which is expected to be under way by early fall. The plant is being changed over to meet the new requirements. All American rights to the design have been secured by the new firm.

NEWPORT AIR TRANSPORT, INC., at Newport, has been granted a charter by the Secretary of State to deal in and operate airplanes. This is the second airplane concern chartered to do business in Newport. The incorporators are William P. Sheffield, William R. Harvey and John R. Haire.

STATE SENATOR WILLIAM H. VANDERBILT was elected president of Narragansett Homesites, Inc., operators of Sperling Field, Newport, at the annual election of officers. Others named were Paul Fitzsimmons, vice president; Richard C. Adams, treasurer; Herbert W. Smith, secretary; and Lorillard Spencer, chairman of the board of directors. The company has purchased Sperling Field and the Chase farm adjoining, making a total area of about 200 acres. Black and Bigelow of New York have been engaged to lay out the field, together with plans for hangars, repair shops, gasoline stations and connection with the New York, New Haven and Hartford Railroad to the water front, so that both land and seaplanes may be used. With the completion of the field, it is understood, it will be turned over to an aviation company composed of local men.

(*Continued on next page*)

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NEW YORK CITY

(Rhode Island News continued)

AN intensive study of all fields suitable for an airport is being made by officials of the Woonsocket Chamber of Commerce. It is the intention of the city to make the proposed airport one of the best in New England. William A. Britton, chief engineer of the Aero Engineering and Advisory Service, Inc., is assisting the chamber.

IT is the intention of the Curtiss Flying Service to open ground schools in both Providence and Pawtucket and to conduct regular passenger service between the Pawtucket field and shore resorts in Rhode Island and Massachusetts. Lines to various cities will also be established during the coming months. The equipment at the What Cheer Airport, Pawtucket, now consists of a Cessna, two Wacos, and one Curtiss Robin. Three other Robins are in the hangar knocked down. Several Stinsons are expected.

NEWPORT AIR TRANSPORT, INC., opened its Middletown airport the other week in what might be called a truly elite fashion. Mrs. Muriel Vanderbilt Church and William H. Vanderbilt drove about the field with their coaches and fours. With them were a number of guests including Mayor Mortimer A. Sullivan of Newport.

ANOTHER new aviation concern will be formed in Newport, with James C. Newlin, Jr., at its head. The company will operate from a base to be established probably at Sperling Field. The firm will operate lines from Newport to Philadelphia and Cape Cod, using Fairchild planes. Herbert W. Smith and the Newport Realty Trust Corporation will act as agents for the new firm.

WASHINGTON, D. C.

[WING OVER]

MAJOR HARRY HORTON, president of Congressional Airport, Inc., which maintains downtown offices in the Transportation Building, and controls the airport on the Rockville pike, qualified for his transport license recently. Major Horton was one of the Army's first aviators and deserves considerable credit for keeping up with his flying, for he is one of the oldest transport pilots in the country, being on the shady side of fifty years of age. He was formerly local distributor for the Duesenburg automobile, and his present firm has the distributorship for the Command-Aire. The pilots at Congressional airport are Frederick Schauss and Bill Payne.

MT. VERNON AIRWAYS, INC., operating from the Hybla Valley Field, has been busy with students enrolled by the Bureau of Standards Flying Club, which is composed of members of the Bureau staff and other Commerce Department employes. Eaglerocks are used for instruction at Hybla Valley where there is a large metal hangar and a field which is one of the largest in the vicinity. E. W. Robertson, the company's president, started in aviation in 1923 with a Jenny which he barnstormed throughout the East and Middle West. Now, Robertson has a profitable business and is drawing students from all over the country. "Ham" Brown is chief instructor.

"WILD BILL" MacKernan, Air Corps Lieutenant on leave from Langley Field, has joined the staff of Washington Airport, and with Don Stuart and Bunny Trundle (both good "Q.B.s") is flying the Ryans, the Wacos and occasionally the Lockheed Vega on the run to Newark. Passenger hopping at Washington Airport is booming during this season, and there is almost always at least one ship in the air from ten in the morning until dark. The amusement park across the road has been purchased by Federal Aviation, Inc. It will be dismantled in order to increase the size of the field.

THE D. C. Air Legion, the local coöperative training club using College Park Airport, has two Wacos which are kept busy from dawn to dusk. Mr. Soles, the legions president, soloed recently and several more students are ready to solo under the tutelage of Howard French, the pilot who wears a beret instead of a helmet. George Brinckerhoff is the other instructor for the legion.

JESS LANKFORD, Chief of the Licensing Section Aeronautics Branch, puts on his uniform and Captain's bars for two weeks active duty at Langley Field during the last week of July, and the first in August.

EVEN the administrative officer of the Aeronautics Branch—the man who signs the checks and keeps track of the inspectors' expense accounts, will be a bonafide aviator soon. This efficient person, Stanley Crosswaite, has four hours dual and will probably have soloed when this appears in print.

NAVY pilots are having a lot of fun these days with the new Boeing fighters which have been arriving from Seattle. A Vought with an amphibion gear is a favorite for cross-country and has been used on frequent flights to Hampton Roads. John Sommers of the Airport Section, Aeronautics Branch, had two weeks active duty at the Naval Air Station recently and puts in time there regularly.

FREQUENT cables have come into the Department of Commerce from Wm. P. MacCracken, Jr., tracing his movements in Europe. Dr. Bauer, Chief of the Medical Section, has returned from his European trip with some new stories of the kind for which he is famous. Major Clarence Young has his new Boeing "fighter" sport model at Bolling Field and has used it on trips for inspection purposes.

FRED NEELY, general manager of the National Aeronautic Association, which organization recently announced the flying club plan whereby clubs may obtain group insurance and the benefits of each other's operating experience, has had his staff busy with applications for charters. No local organization, however, has signified an interest in taking advantage of the plan.

THERE is talk of an aircraft show to be held in the Washington auditorium during September. A. C. Reed of Chicago is in town promoting the show and enlisting the coöperation of local flying organizations, trade bodies and Government officials.

With Congress out of session, there is nothing to report in regard to the airport which enthusiasts desire to be the best in the country, if not in the world. So much talking has been done and so much time elapsed without results that when an airport materializes for Washington it should be super AAA. All possible sites have been surveyed, classified, and all but chosen definitely. When the fiftieth anniversary of airplane flight takes place in December 1953, local and federal officials may still be squabbling. Let's hope that something happens soon. Aviation in America is often judged by progress at the capital, where thousands of influential foreign visitors are entertained each year. Besides, there is a need for an adequate airport in this vicinity which has already become an important aeronautic center.

PENNSYLVANIA

THE dedication of the Williamsport Airport took place July 20, with a three-day air meet extending from July 19 to 21. Army and Navy pursuit planes were present for aerial maneuvers and aerial races were a feature of the event with $4,000 in cash prizes at stake. Commercial planes did passenger carrying. The program included races with a primary cross-country contest, balloon busting, and maneuvers.

THE Johnstown Municipal Airport was dedicated on July 17, with a program in which Assistant Secretary of the Navy David S. Ingalls was the principal speaker. Formation flights of Army, Navy, and Marine planes accompanied the celebration.

The Johnstown airport is owned by the Bethlehem Steel Products Company Air Service, Inc., and is operated by the Johnstown Air Transport Service, Inc. It includes 105 acres and has two diagonal runways, one of 1,600 feet, the other of 1,700 feet. A five-plane hangar has been erected, and a beacon has been mounted.

THE dedication of the Bradford, Pennsylvania, airport took place on July 6 and 8 with an accompanying air meet. Prizes totaling $5,400 were awarded the winners of six races staged during the two days. The races at the air meet were as follows: water-cooled engines under 510 cubic inch displacement; air-cooled engines under 200 horsepower; air-cooled engines

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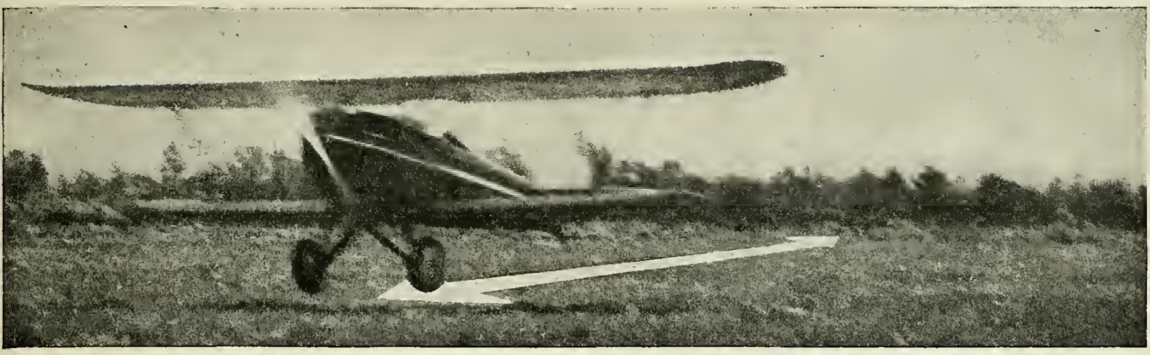

Enlarged from photograph by Fairchild Aerial Surveys, Inc.

1 Off the ground . . . in 85 feet

2 Steep Climb . . .
. . . out of small fields

3 "Hands-off" stability . . .
. . . even in a stall

4 Manoeuverability . . .
. . . responsive as a polo pony

5 Slow landing speed . . .
. . . 35 miles per hour

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DEPARTMENT OF COMMERCE APPROVAL 101

BIRD
BRUNNER WINKLE

(*Pennsylvania News continued*)

over 200 horsepower and under 800 cubic inches; water-cooled engines under 510 cubic inches and air-cooled engines under 200 horsepower; air-cooled engines over 200 horsepower and under 800 cubic inches; and a race free for all engines within above specifications.

PHILADELPHIA

[RUSSELL GARD]

WEEK-END passenger service between Philadelphia and Cape Cod was inaugurated July 3 by the Ludington-Philadelphia Flying Service, operator of the Philadelphia Airport, when a Fairchild 71, piloted by Sanger Green, operations manager of Central Airport, Camden, took off on its initial trip to Wood's Hole, Mass., and return.

Beginning July 5, the Cape Cod Airway, the only regularly scheduled passenger route operating from the Philadelphia district, will operate planes every week-end during the summer, leaving Central Airport each Friday at 4 p. m. and returning at 11 a. m. the following Monday morning.

At Charleston, R. I., one of the scheduled stops, passengers will be landed on the Atlantic Aircraft Field for transfer to Westerly, Narragansett, and Watch Hill.

WILLIS C. BROWN, formerly head of the Sparton aircraft concern at Tulsa, Okla., and now American representative of the Walter engine, has been conducting a 150-hour test on a Walter engine which has been installed in a Spartan at the Philadelphia Airport.

The engines are manufactured by J. Walter & Co., at Prague, Czechoslovakia. That company produces eight different sizes of air-cooled, and two sizes of water-cooled engines.

AT a meeting held recently at the Penn Athletic Club in Philadelphia by the men organizing the first private flying club under the N. A. A. Private Flying Club Plan, initial steps were taken to complete the organization.

A letter was read from the secretary of the National Aeronautic Association Private Flying Club Committee announcing that application of the unit for Charter No. 1 had been approved, and in order to incorporate this honor into the title the name, First National Aeronautic Flying Club, was tentatively chosen. David W. Guy was elected president; Charles Kennedy, vice president; and John M. Carter, secretary and treasurer.

It was the opinion of the members that a plane should be purchased with as little delay as possible, and with all the money pledged, the club is in a good financial position to commence operations.

WESLEY L. SMITH, well-known Philadelphia pilot, captured two first prizes in races held early in July at Red Bank, N. J. He won first prize in a 25-mile race, and later, in a relay in which he alternated with Jack Thropp, of Mercer Airport, Trenton, he again won the main award.

Park Reed and Clark Smith, private fliers at the Philadelphia Airport, also won prizes at the Red Bank meet. Reed came in second in the OX-5 race, and with Smith flying alternately with him, he won third place in a relay. Clark Smith won the dead-stick contest, receiving a cup and an award.

THE new swimming pool at Central Airport was opened July 12 with appropriate ceremonies. Central Airport is rapidly nearing completion, with the two hangars now on the field practically completed. Installation of lighting equipment, construction of runways and other equally important items are expected to require some time before the airport is officially opened.

PITTSBURGH

[BOB COATES]

CONTRACTS for the grading and drainage work of Allegheny County's new airport, comprising 1,000 acres on the Lebanon Church Road, near Bettis Field, have been awarded by the board of county commissioners to the Vang Construction Company for $1,470,379. Voters of the county have authorized the expenditure of $1,500,000 toward the new airport. The city of Pittsburgh is expected to furnish an additional $500,000. Five hundred forty acres of the plot will be developed at this time. Vang's bid calls for the excavation and drainage of 2,815,000 cubic yards at 48 cents a unit. He will place a runway of crushed slag (18,000 square yards), 9,000 square yards of tar penetration course complete, and 9,000 square yards of asphalt penetration surface course complete, in addition to the drainage. Work is to begin immediately. Vang stated that he would put on the job 16 steam shovels, at least 500 men, 60 trucks, six locomotives and considerable track in addition to other equipment.

AFTER no little discussion in city council and not until assurance that the river interests welcomed aircraft, the Pittsburgh Aviation Industries Corporation has been leased a 700-foot wharf at the foot of Ferry St., on the Monongahela River for an amphibion terminal. This marks one of the most important steps in aviation in the annals of Pittsburgh.

The Loening 6-place ship, which inaugurated the new service, arrived slightly more than a week after the lease was consummated and work on a complete terminal with warehouse and floating landing is under way.

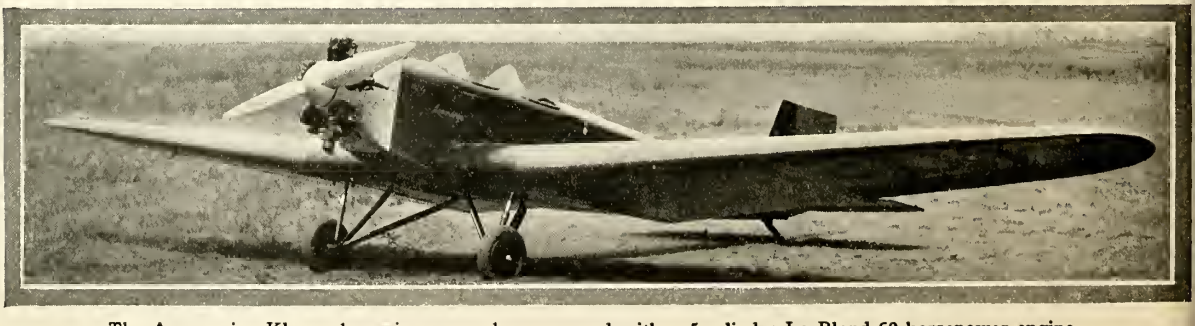
The lease was granted under provisions of an old act which permitted the director of public works to lease river frontage for wharf landings. The city will receive $145.83 per month from the corporation.

The company's Pittsburgh-Butler airport is 11 minutes by air from the wharf landing. Ships will land in the Ohio and taxi to the Ferry St. landing. The "Three Rivers" here affords an ideal spot for amphibion service.

The Aviation Industries Corporation will open a new line to Washington, and plans later to extend service to Cleveland, Detroit and Chicago.

A CROWD of 10,000 enthusiastic persons —8,000 of them boys and girls—gathered at Bettis Field to attend the recent aerial circus, demonstrations and model exposition sponsored by the Pittsburgh *Press*. Thirty-three ships—property of concerns and individuals closely identified with the industry in the district—participated. Bob Dake, pilot for the Pittsburgh Airways Company, took the children from ship to ship and explained their characteristics. The *Langley Junior*, being built from plans drawn up by local air mail pilots, also was shown. Those who took an active part in the event were: Robert Warner, of the Clifford Ball line; S. R. Bigony, J. W. Donahey, manager, and Assistant Manager Trego of Aircraft and Airways of America, Inc.; Capt. Jack Morris, of the Morris Flying Service; Capt. "Hal" Bazley, of

(*Continued on next page*)



The Aeromarine Klemm low-wing monoplane powered with a 5-cylinder Le Blond 60 horsepower engine.

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Must you be satisfied with the mass instruction of the huge aviation schools? Or is there something better? We think there is! A pioneer in modern aviation, J. A. Wright, knowing every need of the airplane mechanic and pilot, has built a school giving *individual* air training, at no greater cost! No two students of flying are alike. Some find one phase of aviation easier than others. Some make rapid progress . . . others are "slow but sure" types. All can make good, if properly trained. Here at the Wright School we smooth out the places that are difficult for *you*. You are not slowed down to anyone else's pace, or rushed through too fast. In the end you are an expert, sure of yourself, and confident of your ability in the shop or in the air.

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The Wright School has complete ground and flying equipment: every facility to train you in the modern science of aeronautics. You are taught to fly in new planes, licensed by the government, and by licensed transport pilots. Our location, at the crossroads of three of the great air lanes, was chosen after careful consideration. Here you are away from big cities, rivers, mountains, and dangerous air currents. You are surrounded by level country . . . ideal landing fields on all sides. There are no distractions. You can apply yourself solely to the job of learning aviation . . . while you receive individual instruction from veteran aviators.

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>
> *—Joe Wright*

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(*Pennsylvania News continued*)

Brilliant Airways, Inc., and Brilliant Flying School; Ted Tany, pilot for Pittsburgh Airways, Inc.; officials of the Pittsburgh Aviation Industries Corporation; Lieutenants H. H. Mills and W. S. Rosenberger; Dick Laughlin, chief pilot for the Pittsburgh School of Aviation; R. V. Trader, head of that school; Freda Zuend, first Pittsburgh girl pilot; Dewey Noyes, veteran air mail pilot; Col. Harry C. Fry, Jr., Pittsburgh-Stinson Co.; Joe Dawson, Dawson Flying School, and Pilots Kit Carson, Ralph Toy and M. C. Wolf.

THE Standard Steel Propeller Company at Pittsburgh has received several interesting orders. One calls for 100 props from the Curtiss-Robertson Airplane Manufacturing Company, St. Louis. Orders also have been received from the Pantswowe Zaklady Lotnicz Company of Poland and from the Royal Air Navigation Company of Holland, one of Europe's largest transportation companies. The Polish concern will use the propellers on Wright Cyclone engines. A recent order was received from the Société Aeronautique Française.

W. C. SMITH, president of Pennsylvania Airlines, Inc., with headquarters at Bettis Field, announces that this company now is in a position to handle conventions and private parties to any destination. The company recently purchased a trimotored Ford.

BOEING and Stout Airlines promise a transcontinental hook-up with Pittsburgh in the new service to be inaugurated October 1. A rail connection at Cleveland is planned, according to Harold Crary of Boeing System, who recently visited Pittsburgh.

J. HARRY PRENTICE, local distributor for Alliance products, has announced that the Oburg-Prentice Company will be Pennsylvania and West Virginia distributors for Alliance planes and Hess motors.

D. BARR PEAT, a pioneer in Pittsburgh aviation and formerly a manager at Bettis Field, has added to his other aviation interests the distribution in this district of the Bird biplane. Peat has contracted for 15 ships from the Brunner-Winkle Aircraft Corporation, Brooklyn. Bettis Field will serve as his distributing point.

AIR passenger service connection between Pittsburgh and Akron has been inaugurated by the Middle States Airline, Inc., now operating a similar service between Akron and Detroit. Bettis Field is the local terminal. Daily one-way service is being maintained. A ship leaves Akron at 6:30 p.m., Eastern Standard Time, arriving at Canton at 6:45, departing from there at 6:50 and arriving at Bettis Field in one hour's time. Return trips are being made from Pittsburgh starting at 8 a.m., Pittsburgh time, arriving at Canton at 8 a.m. and in Akron at 8:20. Lockheed Vegas are being used. The inaugural trip was made July 15.

JOE DAWSON, head of the Dawson School of Aviation, and former major league ball player, will sell the Barling low-wing monoplane manufactured by the Nicholas-Beazeley Co. Dawson also reports that his roster of students is increasing.

J. W. DONAHEY, new manager of Bettis Field, has announced new features to hold interest of the regular Sunday crowds at the field. Air races, stunt exhibitions, parachute jumps, etc., will comprise the main features. Chief among the air races will be 50-mile events for planes powered by OX-5 motors. A score of pilots at the field who are connected with transportation and student instruction companies are available for these events. More than 300,000 cubic yards of dirt will be excavated at the field. Drainage, building and lighting jobs will follow. Bids already are in for improvements.

THE H. H. ROBERTSON COMPANY, of Pittsburgh, has been awarded the contracts for roofs of the two new large hangars at Mitchel Field, two large shop buildings and a warehouse. A similar contract, under the same general government appropriation, has been awarded the Pittsburgh firm for a large hangar at Selfridge Field, Mich., and a machine shop and assembly building at the same field.

CLIFFORD BALL, Pittsburgh-Cleveland air mail operator, has ordered weather report receiving sets for his office at Bettis Field.

AVIATION enthusiasts gathered in the Y. M. C. A. in Ridgway recently in the interests of the new aviation school soon to be established there. J. E. Evans, of Kane, Pa., who has 2,500 hours to his credit, spoke of the new flying field on the Sylvia Benigni farm about five miles from the city. He pronounced it an ideal field.

MEMBERS of the 324th Observation Squadron stationed at Rodgers Field, have been allotted 850 flying hours for the coming government fiscal year, according to Sgt. Leo Herman. This large allotment should give all squadron members ample time to keep in flying training in the squadron P. T.'s, Capt. Hal Beazley, squadron commander believes.

THE University of Pittsburgh is one of the first universities in the country to join with a commercial aviation concern in giving courses in aeronautics and aviation. Courses of college grade in aviation and aeronautics have been added to the curriculum of the school of engineering. The work will be given in coöperation with the Penn School of Aviation of the Pittsburgh Aviation Industries Corp. Ground school courses, field and flying instructions will be given. A four-year course in aeronautical engineering will be inaugurated in the fall. Both men and women are eligible to enroll. Field and flying training will be given at the Pittsburgh-Butler airport of the aviation corporation.

IN addition to the four-year aeronautical engineering course established a year ago, Carnegie Tech announces new short courses in aviation mechanics for the next fall term.

BOB DAKE, head of the Pittsburgh Airways, Inc., announced that his ships flew more than 9,000 miles in one week, as an indication of increasing popularity for flying here. More than 90 flying hours were piled up by his two ships during the week—all in chartered cross-country work.

THE Main Aeronautics Company of Pittsburgh expects to have half of its 700-acre airport ready for operations within 30 days. Herman and Gass, contractors of Latrobe, Pa., are excavating 10,000 cubic yards of earth from the site and Blaw-Knox of Pittsburgh is erecting a 50-foot by 100-foot steel hangar. The airport is located on Dry Ridge near Greensburg, Pa. Russell J. Brinkley has been retained in a consulting capacity for the company.

TENNESSEE

[JAMES S. LINDSEY]

EUGENE FRICKS has recently been made chief pilot on the southern division of Interstate Airlines. Curtiss-Robins are now used to carry passengers for Interstate Lines on this route. One is located at each city on the line.

WORK is progressing on the Chattanooga Municipal Airport. Trees are cleared and the actual surveying of runways has begun.

The Chattanooga Chapter of the National Aeronautic Association was formally started recently. About thirty-five members are enrolled. William Van Dyke is now manager of Marr Field. He succeeds J. W. Mathews.

THE Mohawk Aircraft Company is considering opening a plant in Chattanooga to do assembly work on its new series of ships.

THE first night mechanic's and pilot's ground course for the Universal Aviation School at Memphis, Tenn., was started recently. The Memphis-Universal school was opened the latter part of June. Night courses are held in the downtown West Court Building.

A night aviation welders class is being conducted at the Memphis school. The welding course covers a total of eighty hours, or 2½ months to complete, conforming with the National Society of Welder's recommendation.

The aviation business course given at the Memphis school enables men and women with business experience to learn the aviation business and then coördinate their past experiences with new to specialize in aviation. The training is given in the evening.

Milford Sater, instructor with Universal Aviation School at St. Louis, has been ap-

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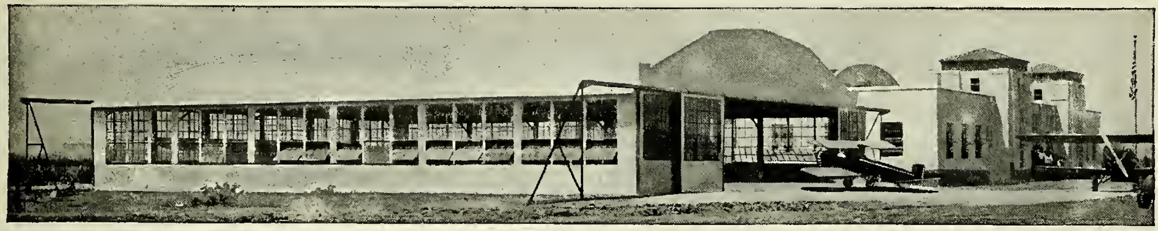
STEEL and STUCCO HANGAR....



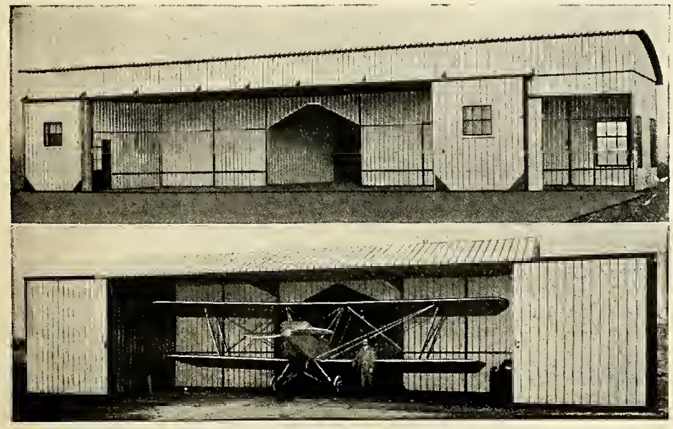
Built by BUTLER for the ART GOEBEL SCHOOL OF FLYING........

AT the Kansas City Airport, the Art Goebel School of Flying is sheltered in buildings of beautiful architectural design. Plans called for hangars with all the fire-proof characteristics of steel construction yet which would carry out the architectural scheme.

In fulfilling the requirements of this assignment Butler has introduced a new type of steel and stucco structure highly desirable for all airport, flying school and factory purposes. Its frame work and roof is of Butler Ready-Made Steel construction, wherein the strength of steel is multiplied by ingenious shaping to attain the greatest strength per pound. Walls are of stucco on heavy steel lathing. Or they may be of brick veneer to the window sills and the upper walls stucco.

In Butler steel and stucco Ready-Made Buildings, appearance is greatly enhanced without lessening such features as completeness, economy in acquiring and in maintenance, firesafeness, speed in erection and structural qualities which make for permanence yet which permit enlarging.

Butler engineering service will supply you with all the detailed information needed to fulfill your particular requirements—including price if you will mention the size and type of structure in mind. Below are pictured two types of individual hangars. A new booklet picturing many other installations of Butler Ready-Made Buildings awaits your request.



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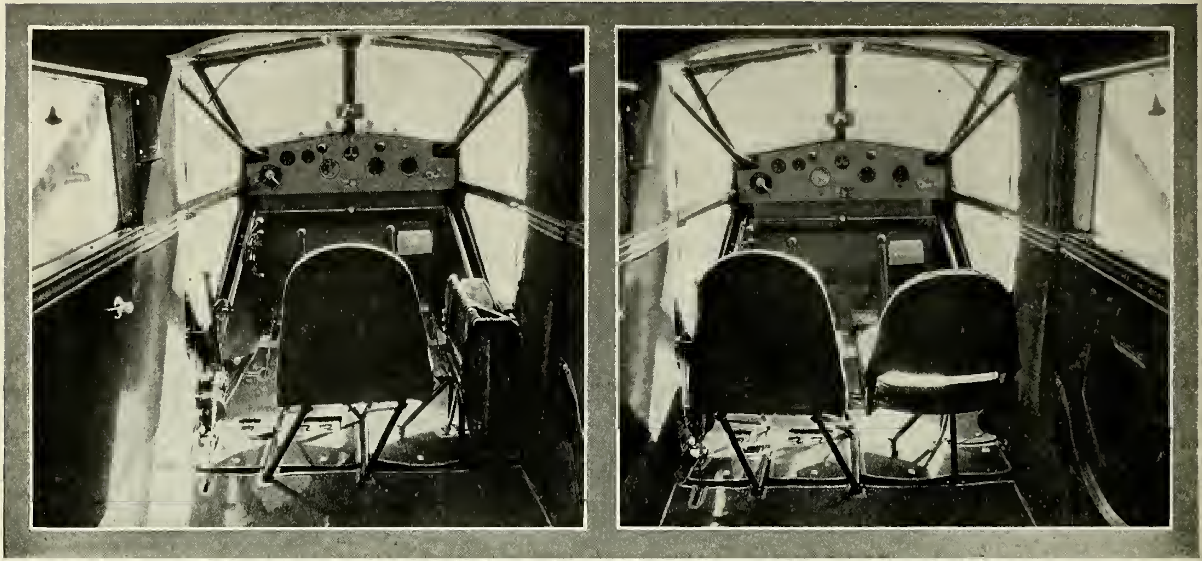
READY-MADE

HANGARS

STEEL BUTLER PRODUCTS



Interior of the Ryan Brougham showing the swing-over pilot's seat and folding co-pilot's seat.

(*Tennessee News continued*)

pointed chief flying instructor at the Memphis school. Sater succeeds Captain Floyd L. Juelson, who was transferred to the position of director.

KENTUCKY

[John Walker Rogers]

ADMIRAL WILLIAM A. MOFFETT, chief of the Bureau of Aeronautics of the Navy Department, in his address as principal speaker at the Lions International Convention held at Louisville, praised the Lions Clubs for their work in establishing airports, and advancing aviation generally in their respective communities.

The admiral also brought out the fact that the United States enjoys a monopoly on the production of helium gas, the non-inflammable non-explosive gas used in lighter-than-air ships, and that this should give impetus to the development of airships. He also stressed the importance of aviation as an arm of defense, as well as a commercial transport factor.

THE Louisville depot of the Curtiss Flying Service at Bowman Field, the municipal airport in Seneca Park has been officially opened with dedication ceremonies that were attended by several thousand persons. Lee Ullrich spoke for Mayor William Harrison who was unable to be present on account of illness.

The hangar has an area of 10,000 square feet. Administration offices, classrooms, reception rooms are included, as well as a completely equipped repair shop, service department. Sales and service on all types of airplanes will be offered. Fifteen planes of the most modern types are on exhibition in the store rooms.

FORMATION of a $5,000,000 holding and operation company which will include the Kentucky Oxygen-Hydrogen Company and The Helium Company was announced by the president of the corporation, Walter H. Girdler.

A large plant will be constructed in Louisville to take care of all the manufacturing processes, and helium plants will be located in Kansas, Colorado and Utah.

Attention was centered on the helium producing units. The corporation is said to control the only commercial supply of helium. These units now supply the United States Government, as well as commercial operators of airships such as the Goodyear-Zeppelin Corporation.

LEBANON recently provided an air marker seventy feet long, with a 65-foot arrow, 4 feet wide. Many towns have put up such signs, which are becoming of considerable advantage to fliers in distinguishing locations.

THE Louisville and Jefferson County Air Board has issued rules for the operation of Bowman Field, the municipal airport in Seneca Park.

In formation as to weather, telegrams, local flying regulations, transportation to and from the field, etc., is available at the operations office.

Open air storage only is available. If the pilot desires, labor and material to stake down planes will be supplied. The fee for this service is two dollars. Personal property may be checked in the rear Army hangar. The field will exercise all precautions to protect planes and property, but will assume no liability.

Visiting pilots must register upon landing. After planes are parked, they will not be moved from the area nor flown except by a written clearance from the operations office. This is necessary to avoid anticipated congestion.

City ordinance limits flying to altitudes of not less than two thousand feet over the city and prohibits it entirely over Churchill Downs during the races.

GEORGIA

[Lt. F. E. Davenport]

GOVERNOR HARDMAN of Georgia has appointed the following House Committee on aviation: Fowler, chairman; Arnold, vice chairman; Representatives Alexander, Battle, Brannen, Brown, Cooper, Courson, Grayson, Griffin, Hightower, Madre, Moore, Parker, Parr, Perkins, Peterson, Powell, Purvis, Richardson, Slater, Stone, Taylor, Trotter, Turner, West, Wilkes, and Wind.

The governor is enthusiastic over the possibilities of aviation in Georgia and has joined the local chapter of the National Aeronautic Association. Colonel Harris E. Willingham of Tate, Ga., a World War flier, has been named in charge of aeronautics on the Governor's military Staff. The Governor says he hopes to see not less than 50 landing fields in Georgia up to standard ratings of the Department of Commerce.

A bill, sponsored by the Atlanta N. A. A., and approved by Governor Hardman, has been introduced into the House of Representatives. It authorizes cities, towns and counties of the state to purchase and operate airports, located within or without corporate limits, without having their charter amendments sanctioned for this purpose by the state legislature. Local governments would also be given power of eminent domain in acquiring property required.

AN award of $100 in gold has been offered by a local paper to the air mail pilot operating in or out of Atlanta who performs the most meritorious service while engaged in his daily work, between July 7 and January 1, 1930. A committee of three has been enlisted to serve as judges. No rules can be laid down when such services are under consideration. All reports of

(*Continued on next page*)

New Building to House Consolidated!

Beautiful new building—pictured to the right—will shortly be completed. It will house the various activities of the great National Air Industries, including Consolidated Air College. Think of getting your training in this remarkably modern building situated right on famous Fairfax Airport.

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BEACON AIRWAYS OF AMERICA, INC.

Aviation Demands TRAINED *Men*

Proper Training Gives you Your Big Chance!

National
Air
Industries
Inc.

National Air Industries, a large aviation corporation, is supplying its needed ground men, airport managers, factory men and pilots from its own college. Men trained here at Consolidated Air College (a subdivision of National Air Industries, Inc.) have many wonderful openings right here in our own organization.

IN aviation big events move swiftly. No time is available to "break in" untrained men. But great are the rewards to the man with TRAINING! Prepare yourself to command your own figure in your own particular field. Look forward to years of prosperity and success. Get right into the heart of the fastest growing industry in the world today. Submit no longer to a dull, monotonous, low pay job. You can do this—after you have had training here at Consolidated Air College—recognized as one of the finest training schools in the country.

Here with us, you step right into a fast moving, efficient College of the Air which is already a proven, successful organization. From the minute you enroll you are under personal supervision from beginning to graduation. Man-to-man instruction provides one transport instructor and one new-production licensed plane for each group of ten students in the fifty-hour class.

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The best of equipment is waiting for you to use. American Eagle Biplanes equipped with OX5 and Kinner Motors, Monocoupes, Cessnas powered with Wright J-5's and Siemens-Halske Motors and a Wright J5-Ryan. Recently we have added the famous Great Lakes Training ship. This variety of fine training planes gives the student every advantage. Veteran instructors, who have helped make aviation history, teach you every detail thoroughly.

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Many students prefer to take the ground school course, and then accept a good paying job in aviation for a time before completing the flying courses. Our ground school teaches every phase of aviation including every detail about motors and equipment, construction, installation, rigging, overhauling and "trouble shooting"; including navigation, meteorology and a new course in parachute operation.

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CONSOLIDATED AIR COLLEGE Inc.

Kansas City, Missouri

(Georgia News continued)

such meritorious service by air mail pilots flying the four routes in and out of Atlanta must be turned in to the paper as soon after completion of the flight or service as possible.

BEELER BLEVINS, Atlanta pilot and instructor, has announced the addition of six new student fliers, which brings the total enrollment in his school to 54. Four women are included in the roll, one having just about completed the course.

THE Southern Military Aviation Schools of Atlanta, Georgia, has completed arrangements for the establishment of a training field 2½ miles south of Marietta, Ga., on the Atlanta highway. Four hangars will be erected on the 40-acre field leased. Capt. A. Jono Smith is in charge of the developments.

THE Atlanta Aircraft Corporation of Atlanta was formed recently by a group of Georgia business men to manufacture Prudden - Whitehead all - metal airplanes. Capital stock in the concern amounting to $300,000 has been subscribed. The officers of the new organization include Robert Gregg, president and treasurer; George H. Prudden, vice-president, and Edward Whitehead, vice-president and secretary.

The Atlanta Aircraft Corporation is building trimotored all-metal low-wing monoplanes. These planes will be powered by three Wright Whirlwind 5-cylinder engines, developing a total of 450 horsepower, or by three Wright Whirlwind 7-cylinder engines having a total of 675 horsepower. This plane is carefully designed in its streamlining, and has an 8-passenger cabin with upholstered chairs and a washroom. The plane attains a top speed of 135 miles per hour or 155 miles per hour, according to the power plant used.

The stockholders of the corporation elected the following directors: C. Howard Candler, N. B. Whitcomb, S. Candler Dobbs, Jr., Henry C. Heinz, William C. Wardlaw, Winship Nunnally, Robert Gregg, George H. Prudden, Edward Whitehead, and N. Baxter Maddox.

LAVONIA has placed the name of the town on the high school building in letters 15 by 8 feet in size.

THE recent bond issue at Columbus listed an item of $30,000 for the purpose of completing and improving the airport.

The city of Columbus owns its own airport; a level piece of ground approximately 90 acres in extent located south of the city on the banks of the Chatahoochee River. The money from the bond issue is to be used to construct a hangar, and install airport lighting equipment. Columbus is located on the route of what is known as the Model Airway of the Army Air Corps, and has been completely mapped by the Typographical Branch of the United States Geological Survey under the direction of the Army Air Corps and adopted with changes west of Montgomery as the route of the Southern Airways Association recently organized in Columbus.

LOUISIANA

[L. F. Cook]

THE Delta Air Service, Inc., of Monroe, and the Fox Flying Service of Bastrop, have recently merged and are now operated as the Delta Air Service, Inc. The capital stock was increased from $80,000 to $250,000 it was announced. John S. Fox of Bastrop, has been made a director of the new company, the officers of which are D. Y. Smith, president; Harold R. Harris and C. E. Woodman, vice presidents; and Travis Oliver, secretary-treasurer. The Delta Air Service, Inc., recently established a triweekly passenger service from Jackson, Miss., to Dallas, Texas, with stops at Shreveport and other points.

THE establishment of a passenger airline from Atlanta, Ga., to Dallas, Texas, through Shreveport is contemplated by the Southern Air Express, Inc., according to announcement of representatives of the company here.

The first step in the establishment of this service was taken June 25 when the Atlanta-Montgomery, Ala., section was put in operation. These plans are the initial steps in the establishment of a network of passenger airlines between the leading cities of the South. Harry P. Williams is president of Southern Air Express, Inc.

WINGS, INC., commercial flying company operating at Texaco Airport, Shreveport, has put four new Stearman planes in operation for the cotton dusting season, according to announcement of Col. Howard F. Noble, president.

MOST of the prospective aviators in the Shreveport area who are examined for government flying licenses pass the tests, according to Dr. D. Dean, Medical Examiner of the Aeronautics Branch of the Department of Commerce. In 18 months approximately 50 have been examined, of which 17 were for transport pilot, 25 for student and four for private pilot licenses.

AIRPLANES of all sizes—landplanes, amphibions and seaplanes—will be able to land and take-off from the New Orleans municipal airport being constructed on Lake Pontchartrain. The new landing field will be 3,000 feet square, jutting into the lake. It will be the airport closest to the city, being 15 minutes from the New Orleans business district.

The plans call for a fill to extend three-quarters of a mile into the lake and to parallel the shore line for a distance of six miles. In the center of the six-mile bulkhead will be a harbor for lake craft. The landing field will be sodded instead of concreted, since the character of the soil lends itself to the luxuriant growth of grass.

Permission to make the fill in the lake, for which a contract involving $611,000 has already been let, has just been granted by the War Department. It is believed that dredging operations can be completed within six months. The new land will be allowed to settle for forty-five days, and then the construction of hangars and other equipment can proceed. Telephone and electric light poles in the vicinity will be removed and the wires placed underground.

The new lake airport will be within fifteen minutes of the postoffice. Although it will be used primarily for mail planes, it will be available to all aviators who desire to land there. New Orleans business men are now looking toward the establishment of freight and passenger air service to Mexico, Central and South America.

OKLAHOMA

[Crenia Sandler]

THE foundation has already been laid and actual construction work is soon to begin on the new hangar of the Braniff Airlines, Inc., subsidiary of the Universal Aviation Corporation, according to officials of the company. The hangar, which will be located on the Tulsa Municipal Airport, will occupy a space approximately 160 feet in length and 120 feet wide and will be built at an approximate cost of $90,000.

Work is well under way on the new Spartan and S. A. F. E. hangars which are also located on the Tulsa airport. The completion of these three hangars will represent a $250,000 hangar building program.

A NEW branch school of the Garland-Clevenger school of aeronautics was recently opened at Amarillo, Texas, in charge of Otis L. Williams, dealer for the Garland Aircraft interests in the Panhandle country.

The course of instruction will include night flying, instrument flying, aerobatics and all phases of ground school work. Two Consolidated Husky Junior training planes, a Stearman biplane and a Curtiss-Robin cabin plane are to be used in the instruction work.

Don Diegel and E. M. Sieber have also been appointed instructors of the school.

A. L. McQUISTION, weatherman for the Southwest Air Fast Express airlines, recently opened classes in meteorology in connection with the McIntyre School of Aeronautics. The course is intended to provide students with meteorological knowledge required to pass Department of Commerce examinations for pilot's licenses of various ratings.

OVERNIGHT air mail service between Tulsa and New York City was inaugurated July 1st by the National Air Transport company. The line will give direct service between New York City, Chicago, Kansas City, Tulsa, Fort Worth and Dallas.

The complete mail schedules are: Northbound, leave Dallas 9:10 a. m., Fort Worth 9:35 a. m., Tulsa 12:10 p. m., Kansas City 2:30 p. m., Chicago 7:20 p. m., New York 6:40 a. m. Southbound, leave New York 8 p. m., Chicago 6:10 a. m., Kansas City 11:50 a. m., Tulsa 2:30 p. m., Forth Worth 5:30 p. m., Dallas 5:55 p. m.

(Continued on next page)

Learn AVIATION
WHERE LINDBERGH STARTED!

This is Now One of the Largest and Finest Equipped Schools in the U. S.

STARTING as a small school back in the days when "Lindy" was training here, the Lincoln Airplane School is now one of the largest, best-known and finest-equipped aviation schools in the United States—with more than $350,000 worth of buildings and equipment, including two modern flying fields. And is famous in every factory and airport as the school that turns out thoroughly-trained mechanics and flyers.

You Don't Have to Fly—Ground Men Make Big Money!

We emphasize Ground Training. Our course in ground work is practical and complete. You learn to become a dependable airplane mechanic or aircraft builder. Also complete aircraft welding courses.

At Lincoln you will train just as though you were a worker in an actual factory or a commercial airport. You work on real planes. Construct, repair and rebuild wings, fuselages, landing gear—every part of a plane. You work on various popular types of aero motors—learn to take them apart and put them back together. We emphasize instruction on the famous Wright Whirlwind engine, navigation and meteorology. Lincoln is one of the few schools actually using a Wright Whirlwind for students to overhaul.

We Make You a Safe, Dependable Flyer

You start flying the day you enroll. A Government licensed transport pilot takes you up into the sky in one of our dual control planes. As you progress you learn straight flying, climbs, banks, turns and emergency landings, until, before you realize it, you are flying solo. Then cross country, acrobatics, etc.

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AIRPLANE SCHOOL
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Students Working on Various Types of Aero Motors

Lincoln Instructors and Planes Carry U. S. Dept. of Commerce Licenses

All Lincoln pilot and ground instructors and training planes are *approved by the Aeronautical Division of the United States Department of Commerce.* Each carries the Department of Commerce license. *Already we have officially applied for examination and rating by the Department of Commerce.*

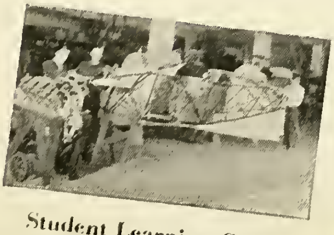
Students Completely Satisfied

The Lincoln Airplane School has never misrepresented. Although students have expressed disappointment about some flying schools, *all Lincoln students are completely satisfied,* and boost this fine school to their friends. We have students from 25 states, several from Canada, two from Alaska. Others from Europe and South Africa.

Low Tuition—No Advance Payment

Lincoln tuition is low. We help our students to get part time jobs. In enrolling, send no advance payment. You should personally inspect any school before you pay a cent. This school will stand the most rigid investigation. Mail Coupon at once for complete information and the story of Lindbergh at Lincoln!

He Just Landed After His First Solo



Student Learning Construction of Engine Carrying Frame

MAIL COUPON NOW!
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Dear Sirs: Please send me at once FREE Literature containing full information about mechanics, builders, welders and pilots courses; low tuition; the Story of Lindbergh at Lincoln, etc.

Name .... Age...................
Address ....
City .... State ....

(Oklahoma News continued)

THE appointment of Lawrence V. Kerber of the Aeronautics Branch, Department of Commerce, as president of the Spartan Aircraft Company, was formally announced by W. G. Skelly, chairman of the Spartan board and head of the Skelly Oil Company. At the same time announcement was also made of the appointment of Rex B. Beisel, former designer for the Curtiss Aeroplane and Motor Company, as vice-president in charge of engineering.

Kerber first gained prominence in aviation as chief of the aerodynamics branch with the Army Air Corps at McCook Field, Dayton. One of his outstanding plane designs was the XCO5-A used by Lieut. Macready in 1926 to establish a new world's altitude record.

In 1927, Kerber was appointed professor of applied aeronautics of the University of Michigan. In 1928, he was named to his recent post, a position he held until his resignation to become president of the Spartan Aircraft Company.

OKLAHOMA CITY

[HAROLD MORGAN]

THE Curtiss Flying Service branch at Oklahoma City has purchased a 160-acre tract of land northwest of Oklahoma City, upon which it has started construction of a modern airport. Clint Johnson is to be the manager of the new field which will have a hangar 100 by 120 feet. Several smaller hangars for plane owners, machine shop, showroom, classrooms, etc., are also to be built.

A site comprising 640 acres of level land east of Stillwater has been optioned, and when crops have been gathered, work will start immediately on the development of the airport, on which $13,000 is to be spent.

BRANIFF-UNIVERSAL airlines have adopted announcement signs for use on waiting ships at each airport station. These signs are posted near the plane, and carry an announcement of the plane's destination, such as "This ship to Tulsa." Call boys are to be added later.

WORK has been started on the Henryetta airport, which is located three miles from town. The port is to comprise 95 acres and will have four runways. Three hangars are to be built.

WILLIAM E. Fletchet, formerly head of the membership committee of the Oklahoma City Chamber of Commerce, has been chosen field manager for the Oklahoma City Municipal Airport.

AN air-rail line to connect Mexico City with the present Southwest Air Fast Express System is now being planned by Erle P. Halliburton, president of the line. The line is to start at St. Louis, terminating in the Mexican capital. The trip from St. Louis to Dallas would be made by air from Dallas to Brownsville by train and from Brownsville to Mexico City by air.

THE citizens of Alva, Oklahoma, have just completed the organization of an airport company and have purchased a 160-acre tract at the edge of the city.

The company, has organized as a corporation, A. C. Davis is president; John Schafer, vice-president; and Tom C. Matthewson, secretary-treasurer.

ARKANSAS

COMMAND-AIRE, INC., of Little Rock, Ark., recently completed and delivered a special plane for Fred Foote of *Life* magazine. This plane is powered with a Wright Whirlwind-Five engine, and has a high speed of 120 miles per hour with a landing speed of 36 miles per hour. It has a cruising range of 520 miles with capacity of two passengers and pilot.

TEXAS

[RUSSELL GRIGSBY]

THE Standard Oil Company of California has installed its sixth Sperry beacon at El Paso, Texas. Its code letters are P-E, candlepower is 10,000,000, and it rotates six times a minute. This beacon, and another 3,000,000 candlepower directional beacon, are mounted on a 54-foot steel tower on top of a mountain near El Paso. The directional beacon points the way toward the municipal airport of El Paso.

BIG Spring is planning a celebration for August 24 and 25 when its airport will be officially opened. The port is to be operated by the Southern Air Transport on a three-year lease. The two-day celebration will include in addition to the usual field events, a parade to show the evolution of transportation.

The field has been used by the T.A.T. Flying Service since the inauguration of the passenger service from Dallas to El Paso a few months ago and is also to be a stop on the San Antonio to Amarillo line, one of five passenger lines which the T.A.T. Flying Service plans to supplement the four already in operation.

A BRANCH of the Garland-Clevenger School of Aeronautics of Tulsa, Oklahoma, was opened recently at the municipal airport at Amarillo, Texas. Otis L. Williams is in charge of the new school. Two Husky Junior training planes are being used for instruction, and the courses of instruction are identical with those of the Tulsa school.

The courses which are offered in the Amarillo school are a private pilot's course consisting of 43 hours of instruction with 18 hours flying time, of which 10 hours will be dual and 8 hours solo, and 25 hours of ground school; a limited commercial pilot's course consisting of 100 hours of instruction, with 50 hours flying time, of which 25 hours will be dual and 25 hours solo, and 50 hours of ground school; and a transport pilot's course consisting of 300 hours of instruction with 200 hours flying time, of which 50 hours is dual and check time and 150 hours is solo practice time, with 100 hours of ground school instruction.

SAN ANTONIO

[GENE SMITH]

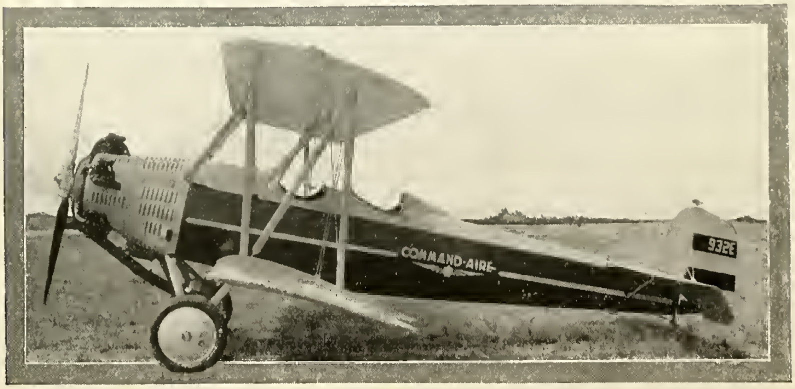
THROUGH coöperation with Texas Air Transport, the Missouri, Kansas and Texas Railroad is offering special airplane service between Dallas and San Antonio. Six hours are cut from the railroad schedule between the two points.

THREE officers of the army of the Republic of Colombia are among the students who make up the new class of flying cadets in the Primary Flying School, Brooks Field.

They were selected by a competitive system to represent their country as students in the Army Air Corps flying schools. Upon completion of their work in this country, they will return to Colombia as air service instructors.

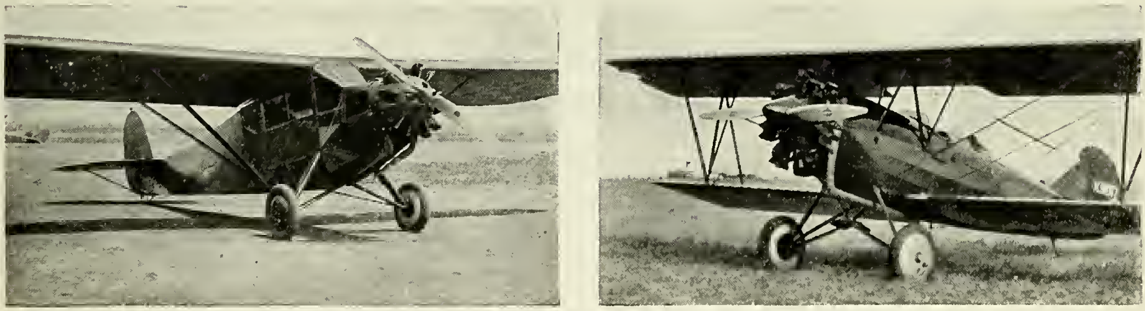
CONSTRUCTION work on Randolph Field, the new Air Corps Training Center 15 miles from San Antonio, will start immediately according to announcement from Congressman W. Frank James, following a conference in San Antonio with Maj. Gen. James E. Fechet, Chief of the

(Continued on next page)



A special job produced by Command-Aire, Inc., Little Rock, Ark.

SALE • used planes at "rock-bottom" prices



PLANES OF THESE TYPES ARE INCLUDED IN THIS SALE

CURTISS FLYING SERVICE offers purchasers of these machines an outstanding opportunity for reliable saving and buying protection.

Each plane in this list has been thoroughly examined. Complete information will be given on its condition.

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Name of Ship	Type	Open or Cabin	No. of Psgr.	Ship No.	Motor No. of Hours	Ship Time	Price As Is Fly Away Location
Fairchild	Mono.	Cabin	5	NC32	Chal. 3	24 hrs.	$5,000.00—Bridgeport
Travelair	Bi.	Open	2	NC5392	Ox5	133 hrs.	1,800.00— "
Fairchild	Mono.	Cabin	5	4440	Wright Whirl.	202 hrs.	8,500.00—Louisville
Monocoupe		Cabin	3	5725	Velie	23 hrs.	1,700.00— "
Travelair	Bi.	Open	2	6037	Hisp. Suiza	108 hrs.	2,800.00— "
"	Bi.	"	2	C8867		18 hrs.	2,900.00— "
Waco 10	Bi.		2	C9506	Ox5	61 hrs. completely rebuilt	1,800.00— "
Fairchild FC2	Mono.	Cabin	5	C5985	175 hrs. 42 ms. Wright J-5	[106 hrs. 17 ms.]	9,000.00—Baltimore
Monocoupe		Cabin	3	C6547	49 hrs. 1 m. Velie M-5	[40 hrs. 1 m.]	1,700.00— "
Monocoupe		Cabin	3	C6987	Velie M-5	[Never set up]	2,000.00— "
Monocoupe		Cabin	3	C7011	Velie M-5	1 hr. 23 ms	1,950.00— "
Travelair	Bi.	Open	2	C5288	28 hrs. 24 ms. Hisp. Suiza	240hrs. 7ms.	2,500.00— "
Travelair	Bi.	Open	2	C6149	165 hrs. 47 ms. Hisp. Suiza	[128 hrs. 24 ms.]	2,800.00— "
Fairchild FC2	Mono.	Cabin	5	NC5643	190 hrs. J5A	174 hrs.	7,200.00—Kansas City
Fairchild FC2	Mono.	Cabin	5	NC3315	210 hrs. Wright J5C	210 hrs.	6,900.00—Hartford
"	"	"	5	NC5458	480 hrs. Wright J5C	[204 hrs. 45 ms.]	7,500.00—Boston
Stinson	Bi.			NC2779	720 hrs. Wright J4	380 hrs.	3,500.00 less motor "
"	Bi.			NC3795	581 hrs. 15 ms. Wright J4	360 hrs.	3,500.00 less motor "
Travelair Type 4000	Bi.	Open	2	NC2607	271 hrs. Wright J5C	[567 hrs. 12 ms.]	3,800.00— " "
Travelair Type 4000	Bi.	Open	2	NC510E	489 hrs. 40 ms. Wright J5C	[791 hrs. 40 ms.]	3,800.00— " "
Travelair Type 2000	Bi.	Open	2	NC1440	372 hrs. 57 ms. Oxx6	[372 hrs. 57 ms.]	1,500.00 with motor " 1,200.00 less motor "
Travelair Type 2000	Bi.	Open	2	NC6012	50 hrs. Oxx6	50 hrs.	2,200.00—Hartford
Travelair	Bi.	Open	2	NC6076	43 hrs. 15 ms. Oxx6	[43 hrs. 15 ms.]	2,200.00—Boston
Waco 10			2	C6508	Just overh'ld	200 hrs.	2,200.00—Pawtucket
Monocoupe	Mono.	Cabin	3	C805	Velie	10 hrs.	1,800.00—Memphis
Waco	Bi.		2	C2923	Ox	580 hrs.	1,700.00— "
"	"		2	C921	Ox	385 hrs.	1,800.00— "
"	"		2	C7263	Ox	112 hrs.	1,900.00— "
Travelair	Bi.	Open	2	NC6295	Ox	115 hrs.	1,800.00—Bridgeport
Canuck	"	"	1	1079	Ox		600.00—Baltimore
Travelair	"	"	2	1141	Ox	5 hrs.	2,400.00— "
"	"	"	2	4265	Oxx6	17 hrs.	2,600.00— "
"	"	"	2	4318	Ox	46 hrs.	2,300.00— "
Robin Demonstrator	Mono.	Cabin	2	C108-E	Ox5 New top ass'y	[110 hrs. 23 ms.]	3,350.00—Garden City, N. Y.
Cessna Demonstrator	"	"	3	C8785	Warner	[183 hrs. 20 ms.]	6,450.00— "
Command-Aire Demonstrator	Bi.	Open	2	C522-E	Ox5	55 hrs.	3,050.00— "

CURTISS FLYING SERVICE

"WORLD'S OLDEST FLYING ORGANIZATION"

(*Texas News continued*)

Air Corps, and Brig. Gen. Frank P. Lahm, commanding the Air Corps Training Center.

Roads, water supply, and utilities are being laid in the field. Present plans for the field contemplate an expenditure of at least $30,000,000, to be made available only as it is needed in construction.

PILOTS of Texas Air Transport will wear French gray gaberdine uniforms from now on. The coats are made army style, with white wings on a black background embroidered over the left breast pocket. In the center of these wings is the company's insignia. White chevrons each representing 250 hours, and denoting the number of hours the pilot has spent in the air are worn on the sleeve.

THE newly organized chapter of the National Aeronautic Association of Victoria, Texas, will work for a municipal landing field at that city as its first objective. This chapter was organized through the efforts of Jack Beretta, Texas governor of the N. A. A., and E. W. Lange of Victoria.

AN airport of more than 100 acres has been dedicated at Kerrville, Texas, 75 miles northwest of San Antonio. The field was the gift of Louis A. Schreiner, capitalist. This is the finest airport in the hill country of West Texas. Brig. Gen. Frank P. Lahm, commanding officer of the Air Corps Training Center, announced that this port will be designated a primary flying field for cross-country flights for Army planes.

FORT WORTH

[Capt. W. H. Scott]

DURING the past nine months, Fort Worth municipal airport made a profit amounting to over $6,951. An itemized report by Capt. Bill Fuller, manager of the port, was submitted to City Manager O. E. Carr and in turn the statement was mailed to all city councilmen at Fort Worth. The showing of a large profit came as a great surprise, not only to the city fathers, but also to many citizens who thought that the port would be a losing proposition for many years.

During the week ending June 15, 315 planes arrived and departed from the port on regular business or air travel. This was a usual week's work with nothing provided as an attraction at the port.

TEXAS AIR TRANSPORT carried 563 air passengers a total of 81,025 miles during June, without accident of any kind. These trips were made over the five passenger lines in operation by the company.

Texas Air Transport will adopt a new system of airport lighting when it takes over its new field at Waco, Texas. Instead of using the usual ground lighting it will use locomotive headlights. These lights will be installed by the city as part of the contract. The port has been equipped with border lights. Two modern hangars will be erected at the field.

SETH BARWISE, president of the Texas Flying Service, has three planes in operation at Meacham Field. Barwise plans a large expansion of the company in the fall. Two Army officers from Brooks Field have joined him in the work. Henry Woods, vice president and chief pilot, is signing up a large number of students.

DALLAS

[Capt. W. H. Scott]

GEORGE W. WILLIAMS, pioneer Texas airplane manufacturer, will remove his plant from Temple, Texas, to Love Field within the next few months. Williams is president of the Texas Aero Manufacturing Corporation. The latest model to be turned out by the firm is an open sports-training ship. It is a two-place monoplane powered with a 90 horsepower Cirrus motor.

THE summer school of the 366th Observation Squadron, Air Corps Reserve, was opened here July 9, with nearly fifty officers of the Reserve on hand to take training. Training is conducted under Lieut. Harry Weddington, commanding officer, and Lieut. Edgar E. Glenn, adjutant. Over 250 officers are expected to take training. Fifteen Air Corps training planes of all types are on the field for instruction purposes.

OVER 150 students are taking training at Love Field from the various companies now operating there, and since this is a year-around field where training can be held winter and summer, over 1,000 students are expected to be on hand for the fall school which opens September 1.

NINE planes recently left Love Field for Sherman to take part in the celebrations at the opening of the new field there. Five Army planes under Lieut. Harry Weddington and four private planes with students of the Dallas Aviation School made up the party. Later the planes made a trip to Corsicana.

CAPT. W. F. LONG announced that the new airplane now in course of construction will be completed late in August. The designing and building of the plane has taken over 6 months. The designer is Werner von Wolfenstein, a graduate of Heidelburg University in Germany. Details of the plane are being withheld until after the test flights.

OPERATIONS at the new Hensley Field at Grand Prairie will commence in August, according to Lieut. Harry Weddington, manager of the field. The field will be used exclusively by the Army, but commercial ships may land there when Love Field is overcrowded.

The new field is a plot of over 250 acres, level and naturally drained. There are no obstructions of any kind except the clubhouse and this is a good distance from the actual landing area. Interurban cars pass the field which is also on the main road to Dallas and Fort Worth.

The Dallas Chamber of Commerce will erect a hangar, and the Government will remove two old hangars from other fields and rebuild them there. A radio station will also be erected, as well as a weather bureau. Lieut. Arthur Reinhart, former Dallas city commissioner, was largely responsible for raising the funds used to purchase the field.

IOWA

[R. W. Moorhead]

OFFICIAL sanction as a regional or Class C aircraft show was granted the second annual Iowa Aircraft Show, held at Des Moines municipal airport July 19, 20 and 21. Prizes totalling $5,000 were awarded in the meet. In the "On to Des Moines Race" a $1,000 prize was presented to the winner and another $1,000 was divided among the next four places.

Another race was the "All Iowa Race" for planes owned by a company or pilot in Iowa, and flown from points within the boundaries of the state. A $500 prize was offered the winner. Other contests included dead stick landing, balloon bursting, stunting and formation flying of commercial planes, parachute drops and speed flying for OX-5 motors.

Iowa Air Tour

TWENTY-EIGHT planes completed the second Iowa Air Tour following six days of flying. Thirty-one ships started on the tour.

The tour established definitely the need in Iowa of larger landing fields unobstructed by trees or fencing. It was found that many of the smaller towns on the itinerary had their landing fields three miles or more from town, while others went to the other extreme and placed their fields so close to town that buildings, railroad embankments, trees and wires offered formidable obstacles.

At the banquet for those entered in the tour and those sponsoring the tour which closed the event, Clarence Chamberlin was the principal speaker of the evening.

Mrs. Muriel Hanford of Sioux City was awarded first place. Sid Cleveland of Des Moines was winner of Class B, and Marion Wearth of Ames was given first place in Class C. Mrs. Hanford flew in a Whirlwind-powered Stearman biplane, piloted by Jimmie Barwick of Sioux City. Cleveland flew a Monocoupe, and Wearth an American Eagle.

John Livingston and W. F. Marshall made the fastest time of any of the planes despite the fact that they were flying their taper-wing sport Wacos in formation. They flew the 905 miles in 7 hours, 21 minutes and 15 seconds.

IOWA CITY has filed an application to acquire ground for aviation purposes. This is the third application to be filed under the new state law permitting a city to acquire an airport after approval by the state board. The other two applications were made by Des Moines and Council Bluffs.

Besides licensing laws and statutes permitting the acquisition of airports by cities,

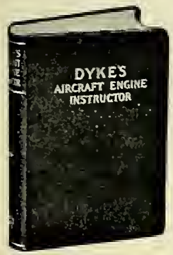
(*Continued on next page*)

The Big 3 for AIR MINDED ambitious MEN

Depend on WILLCOX AVIATION BOOKS

AIRCRAFT ENGINE INSTRUCTOR

By A. L. Dyke



Engineers from some of the best known companies assisted Mr. Dyke in the preparation of this great book, which covers modern aircraft engines and miscellaneous accessories and equipment, such as carburetors, magnetos, starters, generators, aeronautic instruments, etc. Adequate space is devoted to the Wright "Whirlwind," the "Wasp," Curtiss, Packard, Fairchild-Caminez (engine without crankshaft or connecting rods) and other leading engines, including some well known foreign makes. A very complete discussion of the Curtiss OX-5 engine with engine trouble-shooting charts included. Right up-to-date, including the construction and maintenance of metal (and wood) propellers, principle of operation of superchargers and rotary induction, discussions and illustrations of the "Cyclone," "Hornet," "Chieftain," "Challenger," Warner, Velie, Anzani, etc.

Practical, usable information is given on inspection for worn parts and locating troubles and what to do to correct or repair them.

The Aircraft Engine Instructor is more than a book—it's a complete training on aircraft engine construction, maintenance and operation; an indispensable source of ready information for the mechanic and pilot alike.

Contains 404 pages and over 400 illustrations, including folding colored inserts and master charts. It's the book of the hour.

Sent postpaid **$5.00**

AIR NAVIGATION and METEOROLOGY

By Capt. R. Duncan

Licensed Pilot in U. S., Canada, France, England

Here is a book that contains the exact information needed by a flyer to become an efficient air navigator. To study the book and make the widest possible use of it, requires only the ability to read, write and use common sense.

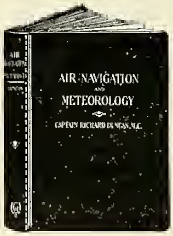
The entire subject is presented in a simple non-technical way without the use of mathematical problems. It explains the meaning of all technical words and terms and deals with maps and charts in a way that the reader cannot fail to understand. The principles of air navigation, weather forecasting, magnetism and magnetic poles, are thoroughly explained before taking up the practical side of flying and the use of flying instruments.

Other sections of the book cover the airplane compass and all instruments used in air navigation, such as the Air Speed Indicator—Altimeter—Course and Drift Indicator—and others.

Complete instructions are given for calculating magnetic variations, deviations, effect of wind on plane in flight (drift), and other problems of air navigation. Night flying, night flying equipment.

Over 240 pages, 70 illustrations. Flexible binding.

Sent postpaid **$3.00**



AIRCRAFT WELDING

By J. B. Johnson, M.E.

Between the covers of this timely book is packed every fact and every bit of information available today, on the art of welding in aircraft design, construction and repair. It covers every method of welding—every type of weld—every weldable metal—in plain, every day language. It shows how welding enters into aircraft design—how ships are fabricated and built with welds—how repairs are made, and best of all—it shows you how to make all the different kinds of welds and how not to make them too, so you can't go wrong. The author has had a wide experience in actually doing and supervising the kind of work which he describes so well for you in his book. He has conducted experiments and made thousands of tests of various kinds. He has trained many men in the art of Aircraft Welding, and is considered everywhere a real authority on the subject.

There is nothing academic or with the school-room flavor in the material he gives you. He talks right from the shoulder in the language of the shops. His book is easy to read and easy to understand. You get every point he brings out, not only easily and quickly, but in a way so you will never forget it.

Nearly 250 Pages. 215 Illustrations. Flexible Binding.

Ready Sept. 1st
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In the Air—On the Ground—In the Shop—If you've got a spark of the "air urge" in your make-up—*get acquainted with Willcox Aviation Books.*

Here are three new books, just as up-to-date as this week's refueling flight and just as practical as practical experienced writers can make them.

They are simplified, well illustrated, finely printed, durably bound—and downright important to your air success. Published for men who want the latest authentic information, without the need for deep and lengthy study. They give you what you want and what you need and give it to you quick. They are sold and guaranteed to be the best books on the subject, and you are the judge, because you get your money back on your own "say-so" if they fail to please.

Step into your nearest bookstore and look over these great books today. Or mail the convenient coupon below, direct to the publisher for the books you want.

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(Iowa News continued)

the last Iowa legislature enacted legislation to permit railroads to operate airlines in Iowa.

THE first test of Iowa's new law requiring licensing of aircraft and pilots is now under way, with information filed against two fliers who cracked-up a half mile south of the municipal airport recently in an unlicensed ship.

According to the law, these men may be found guilty by an indictment of misdemeanor and subject to a fine of $100 or a thirty-day jail sentence, or both.

DES MOINES is to have an aviation bureau sponsored by the Des Moines Automobile Club through coöperation of the of the Yellow Cab Airways, Inc., of Des Moines. This bureau will give out full information on all of the principal airlines and transport companies in the United States. No charge will be made for information.

The Yellow Cab Airways, Inc., reports good business on its recently established air service from Kansas City to Minneapolis and return every week day.

G. B. EPPERSON, representing the Curtiss Flying Service, Inc., has been at Oelwein, Iowa, conferring with the local chamber of commerce regarding aviation day to be held there August 10th.

There are to be four planes in use during the day. A good-will tour, including several towns around Oelwein, is also contemplated in celebration of the day.

TWO new buildings at the Cedar Rapids airport are now under construction. A colonial frame structure, 22 by 28 feet, will be an office and waiting room, with accommodations for Boeing Air Transport and Cedar Rapids Airway, Inc.

THE addition of an aerial surveys division to the Yellow Cab Airways, Inc., with equipment for making aerial photographs of all kinds, including elaborate mosaic maps, has been announced by Russell Reel, president of the company.

This announcement closely followed one in which he revealed that the company had purchased five new Fleet planes to be used for advanced training purposes.

The manager of the aerial surveys division and chief aerial photographer will be James S. Woodman, a former staff photographer with a local newspaper. A Fairchild aerial camera was purchased at a cost of approximately $3,000 and is capable of producing pictures from great heights either obliquely or vertically.

THE Des Moines City Council has passed an ordinance regulating the use of aircraft on the municipal airport. The following license charges are authorized by the ordinance: Monthly, one- or two-passenger plane, $25 summer rate and $15 winter rates; three- or four-passenger plane, $30 summer rate and $22.50 winter rate; four- or six-passenger plane, $35 summer rate and $27.50 winter rate; more than six-passenger type, $45 summer rate and $35 winter rate.

Daily, one- or two-passenger plane, $10 summer rate and $7.50 winter rate; three- or four-passenger, $15 summer rate and $10 winter rate; four- or six-passenger, $20 summer rate and $15 winter rate; more than six-passenger, $30 summer rate and $20 winter rate.

The following provision was made for charges for local flights: "All persons using the airport for carrying passengers for hire or award, where landings are not made at other air terminals or flying fields, shall at all times, in consideration of the right to use the field, abide by and charge at least the minimum rates customarily in force at the airport and hereby prescribed as standard: For single passenger, ten-minute flights, $3; for two or more passengers for ten minutes, $2.50 each, and for flights exceeding twenty minutes, each passenger $5.

"Any violation of the ordinance will be a misdemeanor and the violator liable to a fine of not exceeding $100 or thirty days in jail."

CONSTRUCTION on the Triad, a trimotored, four-passenger cabin monoplane designed by C. L. Ofenstein, chief aeronautical engineer with the Department of Commerce, Washington, has been started by the Saul Aircraft Corporation of Carroll, Iowa.

The motors are of the LeBlond 65 horsepower type. Details of the construction of the ship include the use of chrome-molybdenum seamless steel tubing throughout, solid spruce spars without joints, and Macwhyte tie rods.

The Saul Aircraft Corporation has a temporary factory building on a 50-acre tract one-half mile southeast of the city. W. J. Saul, president, and R. W. Humphrey, secretary-treasurer, state that permanent manufacturing quarters will be erected this fall and an increase made in the force of employees.

THE Sky Harbor hotel has been formally opened at the Des Moines municipal flying field, and night passenger flights over the city have been inaugurated. On the opening night a gala occasion brought approximately five thousand persons to the field to dine at the new hotel or the airport restaurant and to dance in the hangar.

SOUTH DAKOTA

RAPID Aviation, Inc., a recently organized branch of Rapid Air Lines, began operations on the Omaha-Council Bluffs airport on July 4. The new company operates a sight-seeing and taxi business.

SIOUX FALLS, South Dakota, will hold a Sioux Falls Airfair from September 16 to 21. Aerial events with prizes totaling $5,500 are to be staged during the week. A race to Sioux Falls will be included in the program.

JOHN W. MILLER has taken over the duties of the office of manager of the Rapid Air Lines. Mr. Miller was formerly secretary-treasurer of the firm.

NORTH DAKOTA

[LLOYD C. TINNES]

TWO new runways, sixty feet wide, have been installed at Grand Forks Municipal Airport. The surface was first plowed, then dragged, packed hard and surfaced and is now in fine condition, according to George D. Lowers, chief pilot for the Master Aeronautical Corporation.

Taxi business at the Grand Forks Airport has improved considerably over last year, according to pilots there. Within the past two months, one or more trips have been made to Rhame, N. D., Minot, N. D., Bismarck, Minneapolis, Crookston, Fargo, N. D. and other points. Minneapolis is now a fairly common taxi hop from this city.

THE City of Pembina, N. Dak., on the international boundary between the United States and Canada, has purchased a 160-acre flying field and is improving it with the idea of its being made an airport of entry to the United States from Canada, according to city officials.

EIGHT thousand dollars was recently appropriated by the Grand Forks city commission for further improvement of the municipal airport. Equipment now on the flying field includes a six-plane all-metal hangar, a passenger station and lunch room and a tool house. Two new runways were installed recently and more will be added with the money now available.

MINNESOTA

[LYLE F. YOUNGSTROM]

SIMULTANEOUS announcements were made by the Northwest Airways, Inc., and Canadian-American Airlines, Inc., on July 15 of passenger and express airlines to be opened between the Twin Cities and Winnipeg.

Northwest Airways, Inc., which for more than two years has operated the Twin Cities-Chicago air mail and passenger run and also the Chicago-Green Bay route, will begin operations within sixty days on a Winnipeg-Twin Cities run which will connect up with its Chicago-Twin Cities schedule. Northwest Airways has planned a schedule over this route for more than a year, and plans have now matured, according to Colonel L. H. Brittin, vice president and general manager. Ford all-metal trimotored planes will be used.

Canadian-American Airlines is a newly formed company which will put its line in operation not later than July 22, according to Norman G. Warsinske, president. Travel Air cabin monoplanes powered by Wright J-6 engines will be used. The first Travel Air has arrived and the second will be delivered before July 22. Travel Air equipment is to be used throughout.

(Continued on next page)

DALLAS **DALLAS AVIATION SCHOOL** **TEXAS**

Ten years safe sane flying and student instruction

We pay your railroad from your home to Dallas, if you enroll for commercial or transport course.

OUR PRICES—

Why Pay More?

Primary Course, 10 air hours . . .	$ 150
Advanced Course, 15 air hours . .	250
Private Pilot's Course, 20 air hours.	325
Commercial Course, 50 air hours . .	750
Transport Course, 200 air hours . .	2000
Ground Course, 5 months	100

The above prices positively will be advanced on September 1st.

No bond required of our students.

Start training on day of arrival.

Individual instruction for each student pilot.

Licensed instructors and licensed equipment.

Enroll Now

Prices will advance Sept. 1st. Save the difference.

We have 60,000 square feet hangar space.

Our capital stock, $200,000.

Board and room on the field, $8 to $10 per week.

We fly every day in the year.

It takes less time to learn to fly here.

Best flying field in the country.

Dallas has over 300,000 population.

Our students come from all over the world.

Enroll now—come later.

Write or wire us for full information.

LOVE FIELD **DALLAS AVIATION SCHOOL** **DALLAS TEXAS**

LARGEST AVIATION SCHOOL IN THE SOUTH

(Minnesota News continued)

These two new lines will form the link between the airlines system of western Canada and the aerial routes spanning the United States. The Twin Cities-Winnipeg route is strategic in that the Twin Cities terminus will permit passengers to connect with other lines to the south and east.

Organizers of the Canadian-American Airlines include James F. Gould of Minneapolis; Norman G. Warsinske of Minneapolis, president of Air Service, Inc.; Claude H. MacKensie of Gaylord; Colonel Ralph Webb of Winnipeg; A. L. Schaeffer of Jordan; Henrich Schroeder of Shakopee; C. W. Allen of Minneapolis; Frank D. Blair of Minneapolis; Harold S. Lees of Wjeaton; Walter Beech, president of the Travel Air company of Wichita; and Ray Brown, also of the Travel Air company.

The international line will shorten time from Winnipeg to Twin Cities from approximately fifteen hours on present rail schedules to 4⅓ hours by air. Planes of Canadian-American Airlines will leave the municipal airport in St. Paul and Stevenson Field in Winnipeg at 1 p. m. daily, completing their runs at 5:20 p. m., after schedule stops at Wold-Chamberlain Field in Minneapolis, St. Cloud, Fargo, and Grand Forks.

Civic celebrations are planned at each point on the line for the day of the formal opening of service on the new international route.

THE new night air mail schedule of Northwest Airways, formerly announced to start July 15, was postponed because manufacturers of the specially designed speed planes have asked for extra time to complete them. The taper-winged Waco planes to be used are not regular stock planes. Night service will be supplementary to the present daytime air mail transport between the Twin Cities and Chicago.

IMPROVEMENTS costing $100,000 for St. Paul's municipal airport were authorized during the past month by the city council.

The new developmens include construction of another hangar and service building and purchase of 142 acres of land for addition to the present 152-acre field. It also permitted early construction of a north and south all-weather hard-surfaced runway. Completion of this improvement will give the port three adequate runways under all weather conditions.

SCENIC AIRWAYS of Ely, Minn., purchased a Challenger Robin equipped with pontoons from Universal Air Lines. It is being operated during the summer among resorts and camps on passenger and sightseeing tours over lakes in the northern part of this state.

Unanimous approval of the park board's program for improvement and extension of the Minneapolis airport, and authorization of the issuance of $243,000 in bonds to finance the improvements was voted by the city council of Minneapolis. The council also authorized the park board to continue its condemnation proceedings to acquire 240 acres of land directly south of the field.

First steps in the improvement program at Wold-Chamberlain Field got under way last month when work on grading and leveling the landing field was begun.

Eight trucks, twelve men, a steam shovel, and several teams are being used. 2,000 yards of dirt are removed daily. The cost of the work to be done on leveling this summer will be about $100,000. $163,000 will be used for the grading and leveling off of the field, installation of water mains, field lights and fences.

A RECENT field day for aviation at the Wold-Chamberlain Field, Minneapolis's municipal airport, was attended by 75,000 persons, it was announced by the park board.

Airplane races, parachute jumps and novelty events were put on for the visitors. Gas-filled miniature balloons were released from the field for pilots in the event to break with propellers. Chadwick Smith won this event. Charles (Speed) Holman, winner of the recent Gardener Trophy Race, with his Laird plane stunted for the spectators.

DULUTH

[ARTHUR G. PATTERSON]

THE contract for the construction work on the municipal airport in Duluth has been let to the E. O. Dahlquist Construction Company of Minneapolis. The work on the airport is to be completed by November 1, after which date it will be available for use on all types of landplanes.

Duluth is to be the terminal of a new proposed air mail route between Duluth and Chicago, serving several Wisconsin cities en route. Plans for the proposed route were discussed at a meeting of business men held at Madison, Wisconsin. W. B. Dalton of Nekoosa, Wisconsin, was elected general chairman of a committee that will work for establishment of the route. The following cities would be served by the route: Duluth in Minnesota; Superior, Ashland; Eau Claire; Wausau; Port Edwards; Wisconsin Rapids; Nekoosa; Madison; Janesville and Beloit in Wisconsin; and Rockford, and Chicago in Illinois.

THE Great Northern Aviation Corporation, which was recently organized to do business in Minnesota, has purchased the Sergent School of Aeronautics operating at the Pike Lake airport in Duluth. Roger Sergent, former owner of the company, is with the Duluth branch at its recently opened office. Flying and ground courses are offered by the school. Glenn S. Locker of Duluth is vice president of the Great Northern Aviation Corporation.

TOURISTS to the Minnesota Arrowhead country can now take airplane tours over the wilderness sections by service which was brought about through the efforts of the Minnesota Arrowhead Association which has headquarters in Duluth. The Kingston-Rhodes Airways Company of Eveleth, operating a Ryan cabin plane equipped with pontoons, and the Scenic Airways of Ely, operating a Curtiss-Robin cabin monoplane equipped with pontoons, are the two companies handling passengers on these airplane tours.

NEBRASKA

[JAMES R. LOWELL]

AS a preliminary move toward the extension of air mail service to towns of over 1,000 population in northwestern Nebraska, Postmaster Willis of Bridgeport is endeavoring to have an emergency landing field located at Bridgeport.

AN order to report July 1 for a year's service with the First Pursuit Group at Selfridge Field was received by Bert Meyen, well-known as an Omaha commercial pilot and a former Army instructor. He will be a second lieutenant.

TWENTY-FOUR Government weather stations will report to area headquarters at Omaha in the recently announced service, according to V. E. Jakl, government meteorologist, who will direct the new service. These stations are scattered over approximately 360,000 square miles and cover a transcontinental strip about 400 miles in width.

The Omaha bureau will remain on Fort Crook Field as long as the air mail uses that port. Arrangements have been made, however, to provide quarters at the Omaha Municipal Airport as soon as the air mail changes its base.

FREMONT business men have made plans for the establishment of a large airport there and for the $250,000 incorporation of the Nebraska Flying Service, Inc. The field will be established on a 140-acre tract a mile from the city, and the company will conduct a transport line, flying school, photographic surveys, and buy and sell planes.

AN airport celebration is being planned for the Omaha municipal field Labor Day, upon the suggestion of William E. Arthur of the Austin Company, engineering firm in charge of construction of the Omaha airport.

THE Nebraska Sailplane and Glider Club of Omaha has elected H. M. Gregory as president, W. M. Bastien, vice president; Roger Norsikian, secretary; A. Moe, treasurer; and F. Armoneit, master mechanic.

CHARLES KENWOOD, general manager of the Pioneer Aircraft Company of Omaha, has started an aviation school at Hoisington, Kansas, the first of a string of branch schools announced recently by the Pioneer Company.

ARTICLES of incorporation have been filed with the secretary of state by the Fremont Flying Service for the purpose of establishing an airport at Fremont. In-

(Continued on next page)

The Walter
AIRCRAFT ENGINES

Holder of 5 World's Records. Permanent Winner of the Coppa d'Italia.

Winner, 1st and 2nd places, in the International Airplane Competition at Orly, France.

"70"

Rated 70 h.p. at 1600 r.p.m., 5-cylinder radial air-cooled, with a bore of 4.1 inches and a stroke of 4.7 inches. Its displacement is 317 cubic inches and its weight 225 pounds.

"90"

Rated 90 h.p. at 1600 r.p.m., 7-cylinder radial air-cooled, with a bore of 4.1 inches and a stroke of 4.7 inches. Its displacement is 444 cubic inches and its weight 280 pounds.

"130"

Rated 130 h.p. at 1600 r.p.m., 9-cylinder radial air-cooled, with a bore of 4.1 inches and a stroke of 4.7 inches. Its displacement is 572 cubic inches and its weight 350 pounds.

90% interchangeability of parts on models "70", "90" and "130". All models include as standard equipment, dual Scintilla Magnetos and S.A.E. connections. These models are available for immediate delivery. A complete stock of spare parts is available for delivery at short notice. An experienced staff of mechanics is ready to render adequate service at all times.

J. WALTER & COMPANY
PRAGUE
CZECHOSLOVAKIA

Willis C. Brown, Tulsa, Oklahoma
GENERAL AMERICAN REPRESENTATIVE

Walter aircraft engines are in daily use all over the world. 35 well-known aircraft manufacturers now install Walter Engines as standard equipment.

(*Nebraska News continued*)

corporators are C. J. Reynolds, Z. M. Marr, J. A. Woodworth, R. P. Richards, C. J. Malmsten, L. G. Faltys, James D. Milliken, Frank W. Perkins, Arthur Baldwin, John Sonin, Ray W. Hammond, Louis E. May, Henry A. Jencks, H. C. Wilcox, Rodney S. Dunlap, and Lloyd W. Phillips.

AN eight weeks' course in airplane building was inaugurated July 1 by the Arrow Aircraft and Motors Corporation at Lincoln. The corporation's flying school is also in operation and will be enlarged soon by the addition of licensed transport pilots as instructors.

BIDS for repairs on the municipal airport hangar at Grand Island are being sought by the city council. Provision to meet the expense, which will be about $3,000, was made when the bonds for the purchase of the field were voted.

WALTER F. HALLEY, president of the Rapid Airlines and Rapid Aviation, Inc., of Rapid City, S. D., has verified a report that Rapid Aviation has leased 160 acres at Omaha for a private airport upon which will soon be opened a flying school similar to those now in operation by the company at Watertown, Huron, and Rapid City, S. D.

The school's personnel will be recruited from the company's other schools. Halley expects to bring the company's Ford trimotor to Omaha to participate in the field's opening.

THE Kinner Airplane and Motor Company will soon open a sales and service depot at Omaha and has already stationed a motor expert, W. C. Moffat, former British aviator, at Omaha to take charge of the territory.

Companies in Omaha territory which are using Kinner motors are the Lincoln Aircraft and the Arrow Aircraft and Motors firms of Lincoln, the Wallace and the Ta-Ho-Ma aircraft companies of Chicago, Cruizare company at Clarinda, Ia., Bolte Aircraft of Des Moines, Ia., Kari-Keene Aircraft of Sioux City, Ia., Mohawk Aircraft of Minneapolis, Minn., and Mono-Aircraft of Moline, Ill.

PRESIDENT LLOYD W. PHILLIPS of the recently organized Nebraska Flying Service at Fremont has announced that Capt. Floyd Shumaker has been retained as a director and flying service consultant of the corporation.

THE Mutual Flyers Club of Lincoln, Nebr., is a group of young business men who have organized to secure ground and flight training in airplanes. The club has 70 members, 33 of whom are taking flying lessons. Clifford Cunningham is president of the group, Louis Koenecke, secretary, Charles S. Cunningham, chief pilot, and Professor Harry Carter of the University of Nebraska, ground school instructor.

MISSOURI

THE Marshall Flying Association, with headquarters at Marshall, Missouri, has been organized for the purpose of stimulating the growth of flying clubs.

Any individual or flying club is eligible for membership.

Should members desire to organize a flying club they may secure assistance through the organization.

THE Export Department of the Nicholas-Beazley Airplane Company was organized about six months ago under W. F. Potter. Since the first of the year the department has arranged between 20 and 25 export shipments each month going to many foreign countries, including Australia and the Solomon Islands.

Supply depots have been established in Mexico City and Canada, and negotiations are under way for the establishment of representatives in other foreign countries.

ST. LOUIS

[A. W. LEAGUE]

THE St. Louis Aeronautical Association has apparently overcome the "jinx" that has dogged its footsteps and is back in operation again. This organization, composed of a group of young business men, is the only active flying club in the St. Louis area. With "bulldog tenacity," these young men have stuck to the task of reorganization and refinancing, and their supreme efforts have borne fruit in the form of a new and better organization with new and modern equipment.

THE development program at Lambert-St. Louis Field is well under way and present plans call for the work to be completed by the last of October. Cold Water Creek, which crosses the airport on the east side is being detoured. Grading work on property recently added to the airport is being rushed in order to make way for the runways which are to be constructed before the bad weather sets in. Work on the concrete apron, which will be 200 feet wide and 1,550 feet long and will extend along the west side of the airport, has also been started. The 200-foot circle in the center of the airport has been resurfaced and Field Manager Parks and his assistant, A. J. Luig, have promised that a wind tee will be installed immediately. A new 8,000,000 candlepower beacon is being installed to replace the smaller 3,000,000 candlepower beacon now being used. The new beacon will be located on top of the grain elevator at the northwest corner of Lambert Field.

A code of rules and regulations for Lambert-St. Louis Field were drawn up at a recent meeting presided over by Field Manager Parks and A. J. Luig and attended by representatives of various concerns operating on the field. A copy of the field rules has been presented to all pilots operating from the field. An appeal board has been formed to which disciplined pilots may take their cases for review.

AN "air vapor pad" containing a compound to relieve air-sickness formulated by an official of the Southwest Air Fast Express, which operates a passenger line from St. Louis to Dallas, has been put to use on the company's passenger line. According to officials, a few drops of the compound dropped on a handkerchief and inhaled have given relief in the bumpiest of flying. Although plans for marketing it are not yet perfected, attempts have been made to introduce it on other commercial airlines over the United States.

Passengers of this line are provided with an annotated map of the route over which they fly, which assists them in picking out points of interest along the way and thus relieves the tedium of a long flight.

THROUGH the action of Mrs. Lon O. Hocker of St. Louis, school boys and girls will be afforded the opportunity to receive instruction in the construction of airplane models. Mrs. Hocker has turned over to the board of education the balance of a fund she raised in 1919, 1920 and 1921 for the benefit of public playgrounds. The balance of that fund will be expended in sending a manual training supervisor through a course in building airplane models. Upon his completion of the course, classes in airplane model construction will be organized among the school boys and girls of St. Louis.

THE manufacturing concerns at Lambert-St. Louis Field now have 560 employees on their payrolls. The Curtiss-Robertson Airplane Manufacturing Company employs 420 of this number and the Ryan Aircraft Corporation has 140 workers. Several hundred more experts will be needed when the Curtiss-Thrush plant opens in the fall.

St. Louis-New Orleans Line Started

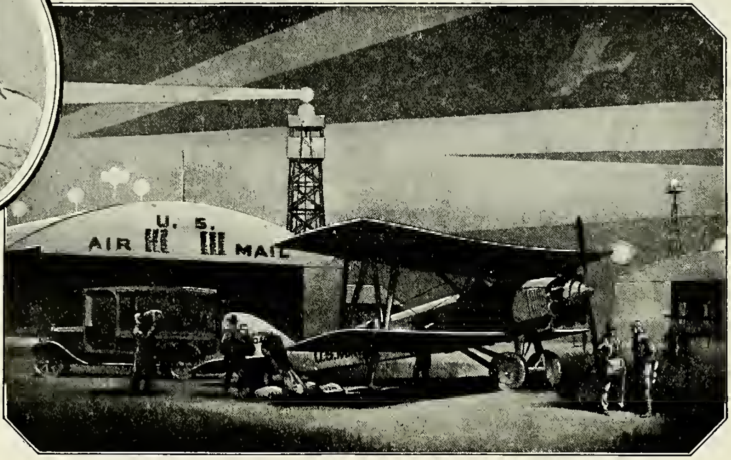
AERIAL passenger service between St. Louis and New Orleans was inaugurated on July 3rd with the arrival of the first ship over the new line opened by the Southern Air Express Company. The planes will be operated on a weekly schedule, with a plane leaving New Orleans every Friday and leaving St. Louis every Saturday morning. The trip consumes eight hours, including stops at Memphis, Tenn., and Jackson, Miss., en route. The fare between the two terminal cities is $60. Ryan Broughams are being used at present on weekly service and are piloted by James Wedell and John Worthem. Plans are being made to put the service on daily schedule, and four new Boeing twelve-passenger trimotored planes have been ordered. It is expected they will be placed in service later in the summer.

GEORGE LEA LAMBERT, son of Major Albert Bond Lambert, has been elected vice president and general manager in charge of operations of the Von Hoffmann corporation. A complete plan of reorganization is taking place in the Von Hoffmann organization. Several new planes have been ordered. The flying school has moved

(*Continued on next page*)

THE LIFE PRESERVER OF THE AIR

(*Over 25,000 Happy Landings*)



Paul J. Kaniut* left Kansas City at 2 A. M., March 22, 1929 with the Dallas overnight mail. Impossible weather forced him to jump at about five hundred feet up. - - -

"If the IRVIN Chute Had Not Opened Almost Immediately . . ."

said Mr. Kaniut, "this letter in all probability would not have been written. I had some difficulty in getting away because the ship was falling on top of me. I was finally blown off the horizontal stabilizer and as soon as I was clear I pulled the cord. Almost at the same instant that the chute stopped my fall, I heard the ship hit the ground. I consider it a great pleasure to be able to write this letter and hereby heartily and conscientiously endorse the Irvin Chute to all."

Infinite care and finest materials go into the manufacture of Irvin Air Chutes. Thorough inspection of even the smallest detail and simple packing insure the perfect functioning of the Irvin Chute whenever called upon.

On more than 25,000 occasions, "live" test, and emergency jumps with the Irvin Air Chute have proven infallibly successful. Adopted by all the air forces of the United States and by 28 other governments it now assures safety to flyers all over the world.

Irvin Air Chutes are sold in all sections of the country at flying fields, airports, flying schools and wherever aviation supplies are available. Among the important distributors are Curtiss Flying Service, Inc., The National Flying Schools, Air Associates Inc. and Nicholas-Beazley Airplane Co. Dealers who are interested should communicate directly with the company.

If there are no dealers near you, write us and we will arrange the most convenient way to supply your needs.

The Irvin Air Chute is available in seat, lap or back types. They are all identical in construction with the exception that two grades of fine silk are used, one priced at $290, the other at $350. Every Irvin Chute regardless of price complies with the standard U. S. Government parachute specifications.

IRVIN Air Chute The Life Preserver of the Air

*Mr. Kaniut is a member of the Caterpillar Club, organized in 1920, and confined in membership to those who have saved their lives by emergency jumps from planes in parachutes. The Club now has 232 members—all but ten of them made their jumps with Irvin Air Chutes.

IRVING AIR CHUTE CO., Inc.
Buffalo, N. Y., U. S. A.
Factories in Buffalo, N. Y. and London, England

Our Motion Picture, "Happy Landings", on standard width film, illustrating actual operation of the Irvin Air Chute is available free of charge to schools, clubs and organizations interested in aviation. Send for booklet and particulars.

(*Missouri News continued*)

into its new quarters on the south side of Lambert Field, and work on the Von Hoffmann hangar next to the present service hangar is nearing completion.

National Show to Be in St. Louis

THE National Aircraft Show, sponsored by the Aeronautical Chamber of Commerce, will be held in St. Louis next February, it has been announced at New York by Charles L. Lawrence, chairman of the show committee. The event will be held in the National Exhibition Company's building, opposite the old air mail field in Forest Park. Ninety per cent of the aircraft manufacturers in the United States are members of the Aeronautical Chamber of Commerce, and virtually all will be represented at the exhibition. The award of the committee is for a period of only one year, but the air board of the St. Louis Chamber of Commerce is hopeful that a permanent designation will be made later. Facts influencing the selection are that the arena, the central structure of the National Exhibition Building group, has 31,500 square feet of floor space and offers floor space heretofore unavailable in most cities. The structure has several openings 90 feet wide, sufficient to admit the largest planes without dismantling. The old air mail field, across the road, offers a suitable landing place close to the exhibition site. The air board of the St. Louis Chamber of Commerce has already started to form plans for the exhibition.

Ryan Aircraft Corporation

THE Mahoney-Ryan Aircraft Corporation will henceforth be known as the Ryan Aircraft Corporation, according to an announcement of Edward S. Evans, president of the Detroit Aircraft Corporation, which recently acquired the St. Louis company.

The new officers of the Ryan Aircraft Corporation are Edward S. Evans, president and Lt. James Work, vice president.

KANSAS CITY

[H. H. JAMES]

PLANS have been announced for the erection of a terminal building, to cost a half million dollars, as a part of the municipal airport development. The building will be on the southeast corner of the field. The terminal will be circular and will measure 450 feet in diameter on the ground floor with an inner building 100 feet in diameter and 75 feet in height. The structure will be entirely enclosed.

The ground floor of the central building will embrace an area of 22,000 square feet. The center structure will be of brick and steel with three stories and basement. The ground and upper floors will be used as terminal offices with a repair shop and heating plant in the basement. Planes landing at the municipal field may taxi into the terminal from all directions to discharge and take aboard passengers.

There will be a structure 60 feet deep, 450 feet in diameter attached to the terminal which will serve as a hangar for planes entering the terminal. The building will be erected with the view of eliminating all fire hazards.

It is also planned to use the building, or parts of it, for aircraft shows and expositions.

AN increase of 800 per cent in enrollment in six weeks is reported by A. A. Yoemans, general manager of the Commercial Airways Flying School. Twenty-four new students were enrolled. Most of the students are from the Middle West, though nearly every section of the country is also represented.

AN American Eagle plane, piloted by William A. Ong, vice president and general manager of Beacon Airways of America, Inc., won most of the honors in the recent All-Kansas Air Tour. The plane, powered with a Kinner engine, won nineteen firsts in the tour competition.

Beacon Airways, Inc., is the distributor for American Eagle planes in the Kansas City territory.

EXCELSIOR SPRINGS, 30 miles from Kansas City, is to have a new municipal airport. The city, famous as a health resort, will have the airport equipped with beacon lights and field lights. The field is one mile west of the city.

THE Hotel Baltimore here has agreed to furnish meals for passengers on the Western Air Express operating out of Kansas City, and the Fred Harvey System is working on a plan to introduce the famous dining service of that organization into air transportation.

THE Fairfax Airport has awarded a contract for new lighting equipment at Fairfax Airport which will cost $15,000. The Graybar Electric Company will install the equipment.

Included in the equipment to be installed is an 8,000,000 candlepower beacon which will rotate six times a minute. It also is equipped with course lights, which consist of two small searchlights with green lenses to flash FAX so a pilot will know he is approaching Fairfax even before the lettering at the airport is visible.

A directional searchlight, to concentrate intense light on any particular part of the landing field, also is to be installed. It will be used to supplement the beacon. Other lighting equipment purchased includes a ceiling projector and height indicator, boundary lights and a wind cone lighting arrangement.

THE Roosevelt Motor Sales Company of Lombard, Ill., will represent the American Eagle Aircraft Corporation in Illinois. The Roosevelt company handles Willys-Knight and Whippet motor cars and owns its airport, consisting of 173 acres of land. The Roosevelt company plans to erect a twenty-ship hangar on the field, which is sixteen miles west of Chicago.

WISCONSIN

[WILLIAM SCOLLARD]

FRANK KAISER, Milwaukee harbor engineer, has been authorized by the harbor commission to prepare plans and specifications for the concrete ramp to be built to the lake at Maitland Field for amphibian plane use. The ramp will cost about $2,500 it is estimated.

LARGELY because of the great demand for its product in the aviation industry, the Kearney and Trecker Company milling machinery manufacturer, Milwaukee, has taken over the buildings and grounds of the defunct Gerlinger Electric Steel Foundry Company. Kearney and Trecker machines are being used by Pratt and Whitney, Wright, Curtiss and the Fairchild aircraft engine manufacturers.

ANNOUNCEMENT has been made in Milwaukee of the formation of the American Carburetion Company to take over the Carburetor Control Company of Los Angeles. Fred E. Keeler, president of the Lockheed Aircraft Company and a director of the Detroit Aviation Corporation, is president of the American Carburetion Company.

W. E. Duersten, associated with Mr. Keeler in several of his enterprises, will be vice president and general manager of the company, which will manufacture a carburetor for airplanes and automobiles, developed by the Carburetor Control Company.

ARTICLES of incorporation were filed recently by the Glider Club of Wisconsin. Incorporators are John P. Schroeter Elmer E. Lessard and A. L. Baumann, all of Milwaukee.

THE Nepco Tri-City Flying Service, Inc., a newly formed Wisconsin Rapids corporation, was recently awarded a five-year lease on the Tri-City Airport. The Nepco company headed by J. E. Alexander, C. A. Jasperson and Isaac P. Witter, was recently granted incorporation papers by the state railroad commission and is permitted to deal in and operate airplanes, supplies, etc.

THE Wisconsin Air College was inaugurated at Janesville recently by officials of the Kempton-Dudley Flying Service, Inc. Both ground school and flying courses are offered by Col. F. H. Jenkins, a pilot of 15 years' experience and a former officer and instructor in the Royal Flying Corps.

THE Comet Engine Corporation, which will construct airplane engines at the Gisholt plant at Madison, Wis., has filed articles of incorporation with the secretary of state.

PLANS are under way for the opening of an airport at Lake Delton near Kilbourn, Wis. It is expected that many visitors will come to this section of the state, which is a

(*Continued on next page*)

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ROBERTSON DIVISION
LAMBERT-ST. LOUIS AIRPORT, ANGLUM, MISSOURI

(*Wisconsin News continued*)

great summer resort community, as soon as plans for the port are completed.

MISS LYDIA KALISHIK, formerly of Milwaukee where she was connected with the American Woman's Aviation Council, has been named manager of the airport at Neenah, Wis. Miss Kalishik is one of the few women airport managers in the country.

SUPERIOR

[Arthur G. Patterson]

THE American Legion of Superior sponsored the dedication of the municipal airport which was held on July 4. Dedication speeches were made by Mayor George E. Dietrich and C. S. Curtis. Stunt flying by Matt Nieminen, guest pilot, and athletic events were also included in the dedication program.

A NEW device which will enable air mail pilots to pick up sacks of mail without landing at airports along mail routes is soon to be tested at the Superior Municipal Airport. The inventors of the device are M. Sullivan, and Benjamin Thrombly.

ILLINOIS

[Edith Tilton]

CLOSE to 20,000 persons thronged the Dekalb County Airport on the closing day of the airport's three-day formal dedication. During the three days' program nearly a thousand passengers were carried.

More than 25 visiting airplanes, including nine government ships participated. Three Army pursuit planes from Selfridge Field, Michigan, three Navy planes, four observation planes and one tri-motored airplane were included among the visitors.

John Livingston, Mid-West Airways, Aurora, Ill., thrilled the crowd with his stunts in a Waco.

Dancing was held in the new 50 by 80-foot hangar which has a 50-foot apron.

RECOGNITION of its markings by the Guggenheim Fund has been received by the Dixon Home Lumber and Fuel Company. Local farmers and business men have signified their intention of erecting markers of a type approved by the Department of Commerce.

Construction of lights on Dixon landing field has been delayed, but all difficulties seem now to be cleared up and the construction will soon start. The location of the 100-foot landing circle has been decided and its construction will be started shortly.

CHICAGO

[Budd Mulloy]

JOY hopping and pleasure riding of all kinds, from sightseeing tours over the city to vacation trips to woodland camps and summer resorts have taken the Chicago citizenry by storm. Every airport in and near the city has one or more companies with a number of planes ready at all times for taxi service and joy hops. Most of the time the majority of these planes are in the air with paying customers, making the business a highly profitable one.

Recognizing the attraction of the Eagle River district of Northern Wisconsin, which abounds in good fishing lakes, the Universal Air Lines have installed a regular service from Chicago to Rhinelander, Wis. The planes leave Friday evening and return Monday morning in time for the fishermen to be at their desks for work. An extra charge is made on the return trip for all those lucky enough to be returning with more than fifty pounds of fish.

Northwest Airways are also capitalizing on the sportsmen by offering special trips to the fishing and hunting grounds of Minnesota. Thompson Aeronautical Company, which operates from Chicago to Bay City, Mich., has made tie-ups with smaller lines operating in Michigan territory from Bay City and other stops, to the fishing grounds.

The joy-hoppers, according to Roger Bronson, manager of the recently opened Sky Harbor airport just north of Chicago, are demanding rides in open-cockpit planes, explaining that they no longer get a thrill in the cabin jobs. The warm weather probably has a great deal to do with their decisions in this.

INTERSTATE Aviation Corporation announced that it has purchased a tract of land near Bensenville, Ill., and will erect a large hangar and administration building for its school of aviation and pilot instruction. Students will be put to work on the manufacture of engines of the valveless Willis design to give them a thorough foundation in engine construction and repair.

THE Chicago *Daily Journal* made a hit with racing fans at the American Derby at Homewood last month by appearing on the scene at the end of the seventh race with papers announcing the winner of the fifth race, the Derby. The papers were rushed to the scene in an amphibion piloted by Bob Moore of the Curtiss Flying Service and Collis (Duke) Jordan, the *Journal's* aviation editor.

CHICAGO will be directly hooked with the Pacific in an all-air passenger service October 1, according to an announcement made by Harold Crary of the Boeing company. Fifteen trimotored planes now under construction will be employed between San Francisco and Chicago. At the same time, Mr. Crary said, an additional hook-up is being made with the Stout Air Lines to take Boeing passengers from the West and carry them to New York in an uninterrupted coast to coast service.

The new Boeing planes will be equipped with radio facilities which will enable the pilots to be in touch with weather observers at all times.

THE Bloxham Aero Supply Co. of Chicago has appointed the following companies as distributors for their products: Art Goebel School of Aviation, Kansas City, Mo., Logan Aviation Co., Cleveland, Ohio, Aeromotive Service & Transport, Salt Lake City, Utah, and the Mid-west Aviation Co., Omaha, Nebraska. The B. G. Spark Plug Co. has appointed the Bloxham Aero Supply Co., as distributors for its products.

INDIANA

[R. B. Nussbaum]

A NUMBER of Indiana cities are planning establishment of municipal airports. The Anderson board of works has signed a five months' option to buy 115 acres of the recently dedicated Welch Field. The Orin Welch Aircraft Company, owner of the field, will retain only 20 acres for its factory buildings and school, using the sale proceeds to increase factory equipment.

Muncie aviation commission has employed A. F. Youngberg, of Leonard Macomber, Inc., of Chicago, to survey Muncie's aviation possibilities, including advantageous airport sites.

Grading and leveling of a municipal port has been started at Princeton. Committees are working for municipals fields at both Rushville and Richmond.

Former service men at Kokomo are proposing that the city aid the privately-owned Shockley Field by installing lights and making other improvements.

Dedication of the Evansville Municipal Airport, set for August 24, probably will be postponed until two months later, Victor Goeke, airport commission vice president, has announced. This will probably eliminate Evansville as a stop on the Cleveland air races route, Goeke said.

THE Renard motor, which has been placed in production by the Wright-Tuttle Aircraft Company, Anderson, Ind., was flight tested recently in a Gates R.S.V. biplane from Welch Field by Lieut. W. R. Peck and Lawrence Genaro.

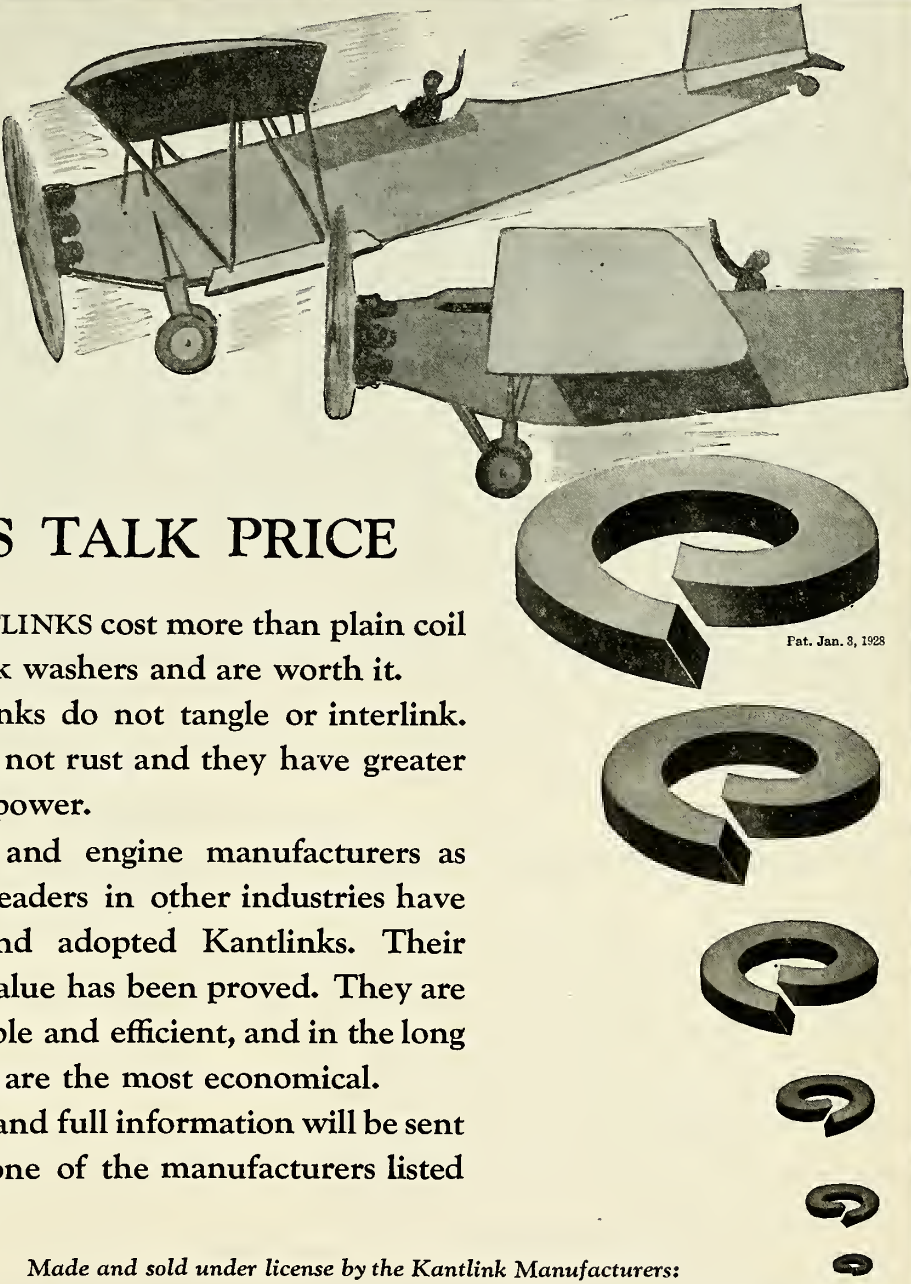
COINCIDENT with inauguration of Transcontinental Air Transport's regular passenger service June 8, the Embry-Riddle Aviation Company, Cincinnati, the same day inaugurated a new schedule of three round trips daily between Cincinnati and Indianapolis.

Mail will be carried on all three flights, passengers being carried in Flamingo monoplanes on the two day-runs. Waco biplanes are being used on the night flights.

Both T. A. T. and Embry-Riddle use the Indiana National Guard airport, Stout Field, better known as the Mars Hill airport. The field is now the best lighted airport in the state, T. A. T. having installed a 500,000,000 candlepower B.B.T. floodlight, boundary and obstacle lights, in addition to the beacon and smaller floodlights already installed by the National Guard.

Construction of the new $75,000 hangar of Curtiss Flying Service of Indiana, Inc., at the Mars Hill airport is practically completed. The hangar and two-story wings are of yellow brick. The hangar will accommodate twenty-five ordinary sized planes

(*Continued on next page*)



Pat. Jan. 3, 1928

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Prices and full information will be sent by any one of the manufacturers listed below.

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KANTLINK TRADE MARK **SPRING LOCK WASHERS**
DO NOT TANGLE DO NOT RUST

THEY PAY THEIR ENTIRE COST IN TIME SAVED-SOMETIMES EVEN MORE

(*Indiana News continued*)

and is large enough for several trimotor ships.

Hoosier airport and Capitol Airways, Inc., each have completed new hangars recently. That of Hoosier is 100 by 128 feet.

A fourth ground school has been started by Curtiss Flying Service of Indiana with an enrollment of forty. E. M. Murphy is instructor. The Curtiss junior ground school for boys will be started immediately.

OHIO

[W. DONALD WALTER]

PORT COLUMBUS is at last a reality. Not a finished reality, of course, but in operation, and daily closer to its final goal as one of the finest airports in the country. The new field was formally dedicated on July 8th, after a three-day celebration. On the same day the first regularly-scheduled T. A. T. passenger ship took off for Waynoka, Oklahoma, marking the official opening of this great transcontinental air-rail route.

THE Air Corps Reserve at Norton Field is minus the services of a splendid mechanic and a faithful friend. Joe Allen, who has been stationed at Norton Field since it was opened in 1923, has joined the staff of Curtiss Flying Service, Inc. Allen is a former Air Service man, but while at this station has been on a civilian status. He has been one of the reasons why Columbus reserve officers fly. An unusually competent mechanic, he has worked early and late for the reserve pilots, and we have always known that our ships have had the best of care.

JOHN M. VORYS has been appointed by Governor Cooper as Ohio's first Director of Aeronautics. Vorys is a prominent local attorney and is chairman of the Columbus Air Board.

To the new director is assigned the task of drawing up a code for the licensing and regulation of commercial aircraft within the state. At the present moment, he is launching an aggressive campaign to provide for adequate marking of all Ohio municipalities. Vorys is a young man, an able one, and he is air-minded. Local flying men believe that Governor Cooper has made a very wise choice.

MICHIGAN

THE Service Steel Company of Detroit, manufacturers of seamless and welded steel tubing, has opened a warehouse in Buffalo, N. Y.

THE Sky Specialties Corporation was formed recently to manufacture accessories for the aeronautic industry. The new concern has taken over the production of Heywood starters, and plans additional activities. The Heywood Starter operates on the injection principle, releasing compressed air that rotates the engine at the necessary speed, and injecting a carbureted mixture into the cylinders.

Arthur L. Cash is president of the corporation. On the board of directors are Chas. B. Bohn, S. D. Don Uyl, Fred L. Riggin, William B. Stout, Stanley E. Knauss, Edward F. Roberts, John Cowan, Jr., and S. L. McKay.

THE Detroit Aircraft Corporation has leased 50,000 square feet of floor space in the Studebaker plant at Detroit, where it will locate its executive offices and manufacturing operations, according to E. S. Evans, president. The plant is so constructed and equipped as to be readily adaptable to the line production method of airplane manufacture which the Detroit Aircraft Corporation plans to use, modeling its operations after the methods of the automobile industry.

The Eastman Aircraft Corporation, which manufactures flying boats, will move into the new quarters from its present plant in Detroit. Operations on the Blackburn line of planes and Marine Aircraft's six-place metal amphibion will also be centered in the new plant.

W. R. CARNEGIE, formerly vice president and general manager of Berry Brothers, Inc., Detroit manufacturers of varnishes, enamels and lacquers, has been elected president and general manager of the Berry company. F. L. Colby, the former president, has become chairman of the board of directors.

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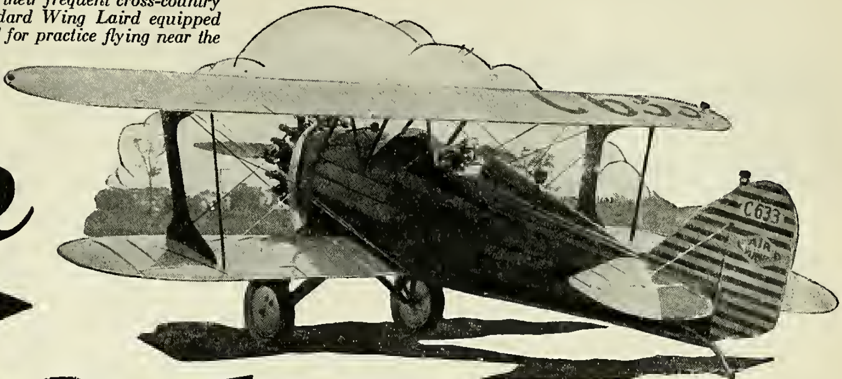

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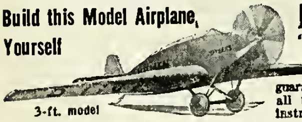

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EQUIPMENT

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MODEL CONTEST

(*Continued from page* 81)

Corsair had been given a score of 94, and that he must leave for Detroit at once in order to start for Europe as American scale model champion. Proctor's expenses are being paid by AERO DIGEST.

Upon his return to the United States Proctor will fly across the country to Washington in a plane of the Boeing System. This flight has been arranged by AERO DIGEST as an appropriate completion to his trip. He will arrive in Vancouver, his home town, on August 18, where the local Chamber of Commerce has planned an Airport Jubilee in his honor. Races will be staged, and plans are being completed to have a Vought Navy Corsair, upon which Proctor's model was patterned, on the field.

The outdoor event began early Thursday morning at Selfridge Field, but after one flight had been timed, officials decided to change the location of the starting bases because the wind had shifted from north to east. The lone flight was not counted. New bases were established a mile away.

Among the early flights was one of exactly ten minutes, made by an indoor plane launched by Herbert Dorsey, 16, Washington, D. C. Others of from six to seven minutes followed, but it was not until the event was almost over that Donald C. Burnham, 15, West Lafayette, Ind., broke the world's record with a flight of 634.4 seconds, 16 seconds better than the duration made by Robert Jaros, Chicago, in 1925 at Dayton.

On Friday twelve senior and twelve junior finalists were named from more than 250 boys who flew indoor ships at Olympia. The day's chief development was the setting of a new indoor endurance record of 513 seconds by Joseph S. Culver, 18, Oakland. Calif. Culver's time was nearly 160 seconds better than the winning time made in 1928 by Aram Abgarian, 16, Detroit.

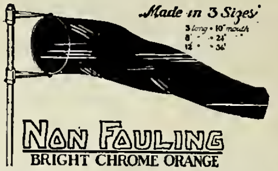
Burnham and Culver, as outdoor and indoor champions, will go to Europe as guests of the *American Boy*, and will compete at Croydon Aerodrome for the Wakefield Cup, offered as an international trophy for fuselage model planes. Proctor has also built a plane to enter in the meet.

The three champions left Detroit on June 28, chaperoned by Mitchell V. Charnley, of the *American Boy* editorial staff, to visit Toronto, Niagara Falls, Ottawa, and Montreal. At Montreal they met Franklin M. Reck, assistant managing editor of the *American Boy*, who was to accompany them to Liverpool, London, Rouen, and the French battlefields. They sailed on the Canadian Pacific liner, *Duchess of Atholl*, on July 3, and were to board the Canadian Pacific steamship, *Montrose*, at Cherbourg on July 26 for the journey home.

Other champions in the several classes are: Kenneth Mudie, 14, Detroit, junior scale model; Victor Chylinski, 15, Detroit, junior indoor; Herbert Dorsey, 16, Washington, D. C., senior outdoor. Ruick Myers, 18, Chicago, won a new event on this year's program when his fuselage model flew two

(*Continued on next page*)

EQUIPMENT



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Westchester
Airport

(Continued from preceding page)

minutes and 47 seconds. To him went the Broadfield Cup.

The highest 48 shared in the $3,000 in prize money, the six silver cups, and the 48 gold and silver medals, while 150 others were awarded bronze medals and certificates by the *American Boy* and the Detroit Board of Commerce. Those who placed:

Stout Indoor Contest

SENIORS (16-20)

First, Joseph S. Culver, 18, Oakland, Calif. (Trip to Europe, Stout Trophy, $100 cup, $200 cash, gold medal); second, Albert Mott, 18, Detroit (Home study scholarship in Aviation Institute of U. S. A., $100 cash, gold medal); third, Ernest McCoy, 17, Detroit ($75 cash, gold medal); fourth, Yoke Wai, 16, Detroit ($50 cash, gold medal).

JUNIORS (Under 16)

First, Victor Chylinski, 15, Detroit ($100 cup, $200 cash, gold medal, summer in Camp Penn Loch, Michigan); second, George Pulas, 15, White Plains, N. Y. ($100 cash, gold medal); third, Frank Salisbury, 14, Washington, D. C. ($75 cash, gold medal); fourth, Jack Kazanjian, 15, Highland Park, Mich. ($50 cash gold medal).

National Outdoor Contest

SENIORS (16-20)

First, Herbert Dorsey, 16, Washington, D. C. ($100 cup $200 cash, gold medal, one week at Camp Crosley, a football training camp for high school players); second, Donald Shetland, 16, Providence, R. I., ($100 cash, gold medal, home study scholarship from Aviation Institute of U. S. A.); third, Ruick Myers, 18, Chicago ($75 cash, gold medal); fourth, Ernest McCoy, 17, Detroit ($50 cash, gold medal).

JUNIORS (Under 16)

First, Donald C. Burnham, 14, West Lafayette, Ind. (National Outdoor Trophy, trip to Europe, $100 cup, $200 cash, gold medal); second, George Mueller, 15, Chicago ($100 cash, gold medal); third, Norman Fain, 14, Providence, R. I. ($75 cash, gold medal); fourth, Edward Harms, 14, Evanston, Ill. ($50 cash, gold medal).

Scale Model Contest

SENIORS (16-20)

First, Louis Proctor, 19, Vancouver, Wash. (Trip to Europe by AERO DIGEST, $200 cash, $100 cup, gold medal); second, William Chaffee, 16, Detroit (home study scholarship of Aviation Institute of U. S. A., $100 cash, gold medal); third, Joseph M. Sevila, 19, Springfield, Mass. ($75 cash, gold medal); fourth, Floyd Kowalak, 18, Buffalo, N. Y. ($50 cash, gold medal).

JUNIORS (Under 16)

First, Kenneth Mudie, 14, Detroit ($200 cash, $100 cup, gold medal, one week at Camp Crosley, a football training camp for high school players); second, George L. Thompson, 15, Minneapolis, Minn. ($100 cash, gold medal); third, Ray Shepherd, 15, Hilo, Hawaii ($75 cash, gold medal).

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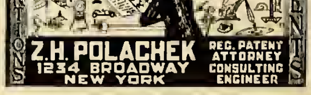

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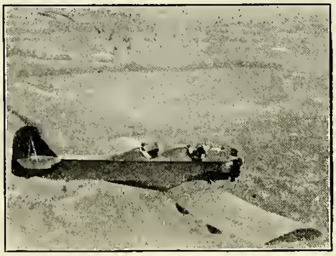
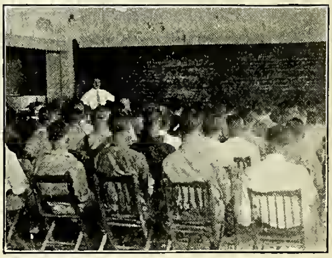
AN AVIATOR IN THE MAKING

1. Howard Boggs, Marshall Flying School student, leaving home early in the morning. Our students live in the fine private homes for which this old Southern town is noted.

2. Leaving for the Field in our privately operated station wagons—after breakfast with the "gang."

3. At Marshall Flying Field—"going over" all-metal structured Barling NB-3, the New Day Plane.

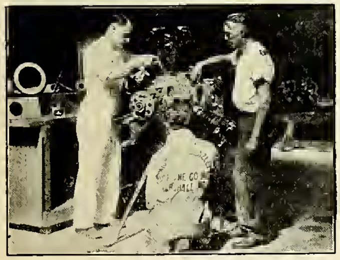




4. Howard is receiving final instructions before taking off in the famous NB-3, that flew from Brownsville, Texas to Winnipeg, Canada—1650 miles in 16 hours.

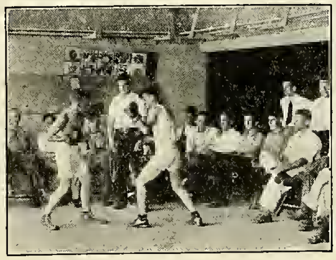
5. Howard and his instructor in the air—experiencing the thrill of a real "bird-man."

6. After lunch, a session in the classroom where highly trained instructors lecture on the theory of Aerodynamics and kindred subjects.



7. In the laboratory, Whirlwind Motor instruction. Howard is also learning about many other radial type, air-cooled and V-type, water-cooled engines.

8. (center) It is mid-afternoon and Howard is welding—a real necessity in modern all-metal construction.



9. No phase of aviation is overlooked at Marshall. (above) Howard is studying aviation salesmanship and exporting—training for the executive positions in the industry.

10. Boxing matches, banquets, swimming and other recreations round out the student's life at Marshall, and help make this original "College of the Air" America's most popular flying school.

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Dear Mr. Souther—Please send me more information on the "College of the Air."

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Address ....

FOREIGN NEWS IN BRIEF

Compiled from reports from AERO DIGEST'S correspondents, the Automotive Division and the Transportation Division, Bureau of Foreign and Domestic Commerce

CANADA

Fairchild Aircraft, Ltd.

FAIRCHILD AIRCRAFT, LTD., is the Canadian branch of the Fairchild Aviation Corporation, formed recently to manufacture airplanes at Longueuil, Quebec. The company has acquired 265 acres at Longueuil, which is about five miles from the business center of Montreal, and work has started on the construction of an airport for both landplanes and seaplanes. The site is located on the bank of the St. Lawrence River. Buildings will include a factory for the manufacture of both air and marine planes, as well as hangars for the company's own use and for rent to private plane owners.

The Fairchild plant at Longueuil will measure 140 feet by 260 feet. Being "L" shaped, the property permits a maximum runway of more than 6,000 feet in the direction of the prevailing wind. In every other direction the runways are more than 3,000 feet long. At the side of the airport the seaplane base has water of a depth sufficient to operate seaplanes of all sizes and is sheltered by a small island. Service depots and district sales offices will be started immediately in Winnipeg and on the Pacific Coast.

[JAMES MONTAGNES]

MEDICINE HAT, Alberta, is to have an airport to connect it with the other principal cities in the Canadian West, now linked up with the Winnipeg to Calgary airline. Medicine Hat will be linked directly with Calgary, Regina and Moose Jaw at the opening of its airport.

THREE seaplanes recently left Remi Lake, Northern Ontario, for regions bordering on the Hudson Bay. The planes carried a party of Dominion and Ontario Provincial officials on a treaty paying flight to the northern Indians. They also carried two Royal Commissioners who went north to make a new treaty with about 3,000 Indians who live in an area of some 130,000 square miles north of the Albany River. The territory occupied by these Indians is today the objective of aerial freighters speeding northwerd with prospectors and mining engineers, to open up a new country in which mineral finds are numerous. The airplane has helped to open this country fifty years ahead of its time.

Two Royal Air Force ships, a Fairchild and a Fokker, as well as an Ontario Provincial Air Service Gipsy Moth comprise the government air party. The director of the Provincial Air Service, Captain Roy Maxwell, and the Deputy Minister of Indian Affairs, W. C. Cain, left Toronto to meet the other two planes at Remi Lake. Besides arranging the treaty and taking north the sum of $50,000 as a mark of good will to the Indians, the party took orders inland for missionaries in the district, mail and cameramen to take photos of the timber and water power resources of the region.

EASTERN CANADA

[C. P. C. DOWNMAN]

CROSS-COUNTRY flights to other towns and cities within a radius of two hundred miles will be organized by the Montreal Light Aeroplane Club as an inducement to its members who have secured private pilot's certificates to take increased interest in aviation. The cross-country trips will take place on either Wednesday or Thursday of each week, and will be made with a fleet of three or four planes under the direction of Captain A. E. Golds, chief instructor of the club.

It has also been arranged to hold weekly luncheons, at which it is hoped that all members wil attend.

WESTERN CANADA

[C. D. MCCABE]

THE Fort William Aero Club was officialally opened June 19 at its new airdrome called Bishop Field, in honor of one of the Allies' most prominent aces, William Bishop. The club has two Moth planes and a membership of over 60, with J. A. Dickie as instructor. The field is located about nine miles from the city, adjoining the municipal golf links.

ENGLAND

Anniversary of First Non-Stop Transatlantic Flight

[EDMUND HAWTHORNE]

BRITAIN'S new Secretary of State for Air, Lord Thomson, presided at a luncheon at the Savoy Hotel, London, on June 14th, in celebration of the tenth anniversary of the first non-stop transatlantic flight by Sir Arthur Whitten Brown and the late Sir John Alcock.

SQUADRON leader A. G. Jones Williams and Flight Lieutenant N. H. Jenkins, pilot and navigator respectively of the Fairey-Napier monoplane, are back in England from their non-stop flight to India.

They stated that for 50 hours they were awake and at work, and though they each took turns at the controls, the relieved pilot did not attempt to sleep but spend his time working out the course, entering notes in the log-book, and estimating ground speeds and fuel consumption.

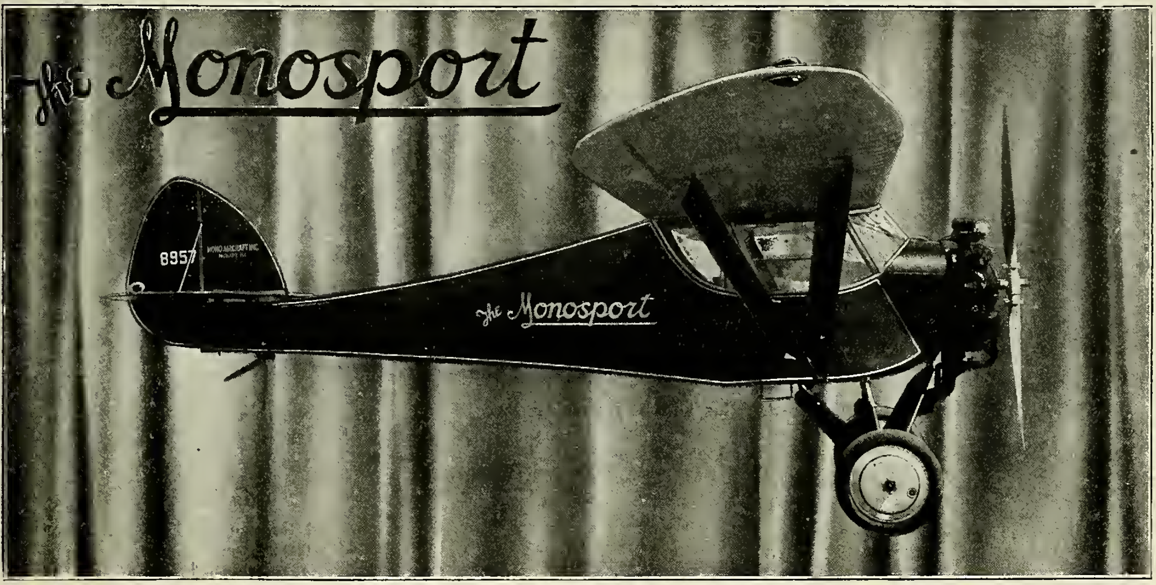
Since the flight did not break the "distance" or "endurance" records, a further attempt will be made within the next month or so. The route to be followed will most probably be the Cape Town route as was originally intended.

The Premier's Air Trip

MR. RAMSAY MACDONALD, Britain's new Premier, flew from Losseimouth to London recently, in a Royal Air Force Fairey bomber. The plane was piloted by Flt. Lt. Heslop and left Lossiemouth at 10:30 a. m. It arrived at Hendon airdrome, London, at 4 p. m. A stop was made at Catterick where the Premier and his pilot had lunch.

(Continued on next page)

Premier J. Ramsay MacDonald (left) as he completed a flight at Hendon recently



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FOR the sportsman pilot seeking high speed, maneuverability, built-in strength to withstand the rigors of any stunt maneuvers, coupled with all year 'round comfort and distinctive luxury, the new Monosport captures the fancy of every pilot able to qualify for its ownership.

Since its first introduction it has beaten in speed everything powered with the same engine. It takes every acrobatic maneuver known to the book with remarkable ease.

There are over 800 r. p. m. in reserve with full load. Despite its helicopter characteristics nothing is slighted —navigation lights, the panel is filled with the best instruments, seats are wide and roomy, large luggage compartment, upholstered in genuine leather, Bendix brakes, Oildraulic shock struts, steel propeller, five hours in gasoline. Colors are optional.

Smart in appearance, comfortable, strong, maneuverable, fast—$5750 with Kinner engine—$6350 with Warner engine—deliveries fifteen days after acceptance of order.

Additional information on request.

MONO AIRCRAFT CORPORATION
Division of Allied Aviation Industries, Inc.
MOLINE, ILLINOIS - U. S. A.

The British Armstrong-Whitworth Atlas with a Jaguar engine.

(Continued from preceding page)

This is the first "business" flight to be undertaken by an English Premier. Mr. MacDonald's verdict on alighting was to the effect that flying was the best means of getting about the country.

FLIGHT LIEUT. R. L. ATCHERLEY won the two day King's Cup Race on July 6 at Heston, Middlesex, England, when he finished the 1,169 mile race in his Gloster-Grebe biplane, powered with an Armstrong Siddeley 385-horsepower Jaguar engine, with an average speed of 150.3 miles per hour. Lieut. L. G. Richardson flying a Moth finished second and W. L. Hope in a Gipsy Moth came third. Forty-one planes entered the race, sixteen dropping out because of the gale that was hindering the planes. Four of the entering planes were powered with engines above the 110-horsepower class.

FRANCE

THE Comité de la Chambre Syndicale Industries Aéronautiques will hold its next aeronautic salon at the Grand-Palais, Paris, from November 27 to December 14, 1930, according to a recent announcement of M. Lioré, president of the body.

ITALY

THE Fiat 7-cylinder radial air-cooled engine produced a few months ago for use on a two-passenger touring plane, has recently undergone a 150-hour government acceptance test, carried out in periods of ten hours. The engine has a bore and stroke of 100 by 120 millimeters with steel cylinders and aluminum head, and develops 85 horsepower at the normal engine speed of 1,600 revolutions per minute.

RUMANIA

AIR service between Rumanian towns has been inaugurated by the government of Rumania using planes and pilots of the nation's army. Service is given between Bucharest and Galatz, Issay and Czernowitz, Bucharest and Sibiu, and Sibiu and Cluj. Four other lines are planned. The fares on the airlines are slightly less than first class railroad fares.

MEXICO

[MONT HURST]

TWO kilometers of the road from Tampico to the new flying field have been graveled and work on the remaining two and a half kilometers is going ahead rapidly. The road will be completed in a month or so and traffic will be enabled to move in wet weather the same as dry. Two-thirds of the aviation field east and west runways have been grubbed. More than two hundred men are working on the field and it is being graded and otherwise improved.

THE Tuxtla Guitierrez airline will have its terminus at Iguala, Guerro, and will extend to the following towns: Puerto Angel, Pochutla Hidalgo, Jamiltepec, Pintoepa, Nacional, Ometepec, Ayutla, Acapulyo, Chilpango, and to Igula.

Citizens of the towns of Coixtlahuaca and Teposcolula, in Caxaca, have asked the Government to provide airports for the two towns. More than twenty-five villages and towns have also signed a petition requesting the fields. They have offered to donate the lands if the Government will provide the facilities and improve them.

ALL landing fields of the Cia. Mexicana de Aviacion are being reconditioned and improved to the highest point of efficiency. At Merida the rocky soil of the field is being levelled and drained and erection of new hangars is going on. The field at Villahermosa is also being made into a year round field and another hangar and passenger depot built.

THE Cia. Mexicana de Aviacion will put three mail and passenger planes into service on the line between Tuxtla Guiterrez and Mexico City. Towns which will be served by the new line include, Salina Cruz, Tonala, Tuxtla Guiterrez, San Cristobal de las Casas, Comitan, Huantla, and Tapachula. Trips will be made each day.

REGULAR express service was recently inaugurated on all air mail and passenger routes of the Cia. Mexicana de Aviacion. Railroads between the capital and Vera Cruz carry packages to airlines.

Fermando N. Gonzalez has been granted a concession to operate an air mail and passenger service by the officials of the Department of Public Works. The routes the concessions were granted for are Tia Juana and Mexico City. Another service between Mexico City and Acapulco with stops at Cuernavaca, Iguala, Chilpancingo and Tierra Colorada.

Concession also was granted to Mario Gomez Daza, who represented Carlos Alarcon, to establish air routes between Ciudad Juarez and Mexico City. The two companies are going to use trimotored Fokkers and service will begin over these routes within the next few months.

GERMANY

THE German Reichstag has appropriated 26,000,000 marks ($4,177,600) for the air budget of Germany, according to a recent unofficial report. The German Minister of Transportation submitted an estimate of 68,000,000 marks but revised it to 54,500,000 marks. Only 26,000,000 marks were appropriated.

During 1928 the Luft Hansa received a subsidy from the Minister of Transportation of 22,500,000 marks; in 1929, they received 10,000,000 and in addition received private credits amounting to 6,000,000 marks from German banks, the interest on these funds being paid by the government. This latter 6,000,000 was to be used to pay debts incurred by the purchase of equipment before the cut in the air budget was made. The Luft Hansa has reduced its staff about 30 per cent, including pilots.

SOUTH AMERICA

COMBINATION ship-plane tickets are now available for travel from the United States to west coast countries of South America. The new service links the service of ships of the Pan American Union with that of planes of Peru and the United States. Two new Diesel motorships, *Santa Inez* and *Santa Rita*, are used in the new fast service.

A CIVIL airport is to be established in Cordoba, Argentina, adjacent to the military aircraft factory. The first steps have been made toward the installation of the hangars which are to be constructed by the Argentine Postal Service in connection with the new air mail route between Bahia Blanca and Comodoro Rivadavia.

AUSTRALIA

THE Australian Aerial Services recently completed five years of operation, having flown 800,000 miles, and carried 12,000 passengers without an accident. Since November 11, 1924, the Services have completed every scheduled flight.

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FOR ten years the Lincoln Page Three-Place Biplane has been soaring the skyways—an age in the infant industry of aviation. And because of its stability, speed, maneuverability, comfort, economy and low price—this all-purpose aircraft has become the standard utility airplane of America.

For sport, business or student training, you'll find the Lincoln P 3 the most practical plane. It's the finest constructed, greatest performing airplane of its size and price on the market. Ten years of superior performance have proved it so. Write for FREE complete literature and specifications!

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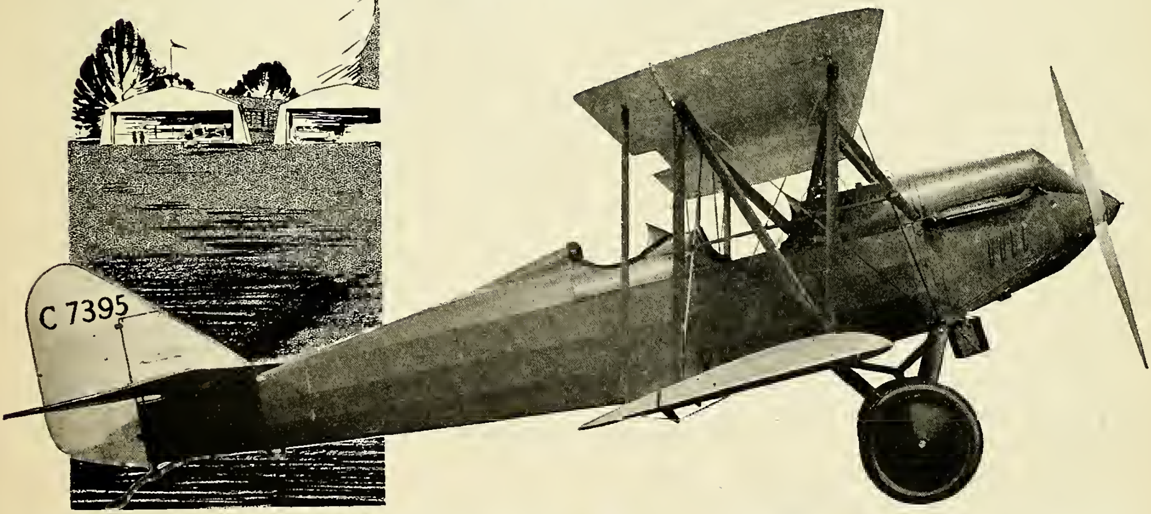

LINCOLN PAGE
THREE-PLACE BIPLANE

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CONCLUSION—Terminology.

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AIR—HOT AND OTHERWISE

(*Continued from page 70*)

anyone should happen to be on your staff who is working for the benefit of certain contractors by trying to drive others from the field, you'd like to know it—wouldn't you? Well, Mr. Brown, remember that a man in your position has to watch everyone, every day and night and minute. If you could only find out if any of your subordinates are speculating on the market, and at whose suggestion—that would be helpful information, too. "Mr. X" on a stock broker's books has been a person of disaster to more than one man.

A good man for you to talk with, Mr. Brown, is the Hon. Frank Hitchcock, once the occupant of that exalted eminence to which you have been raised. *He ran the Post Office without a deficit.* He now is interested in aircraft manufacture and the development of air transport.

MUTTERINGS are still rumbling among the ancient ones in our grand little Army, over the nonsensical audacity of those pestiferous youngsters who conducted, several weeks ago, the Air Corps Maneuvers at Wright Field, Dayton, Ohio. Why, the impudent young scoundrels actually on a foggy night and in weather so outrageous as to forbid refueling, flew from Wright Field in far Ohio and bombed New York upon the seaboard. Impertinence? Irreverence! What are the good old infantry and cavalry to do about such youthful sassiness! Why, presently the red-faced colonels, and the galloping majors, and the Army mules, and so on, will be pestered into absolute attacks of nerves!

The Keystone bomber which wrought all the mischief to the old Army's feelings (with the old Navy equally disturbed) flew quite alone from Dayton, and (theoretically) wiped out Governor's Island and a few essential details of the American metropolis. Nor was this all. After this, those inconsiderate boys in the machine flew on to Bolling Field before they called it a night's work. In warfare they might have dropped bombs on the Capitol and wiped away the White House before slipping into bed.

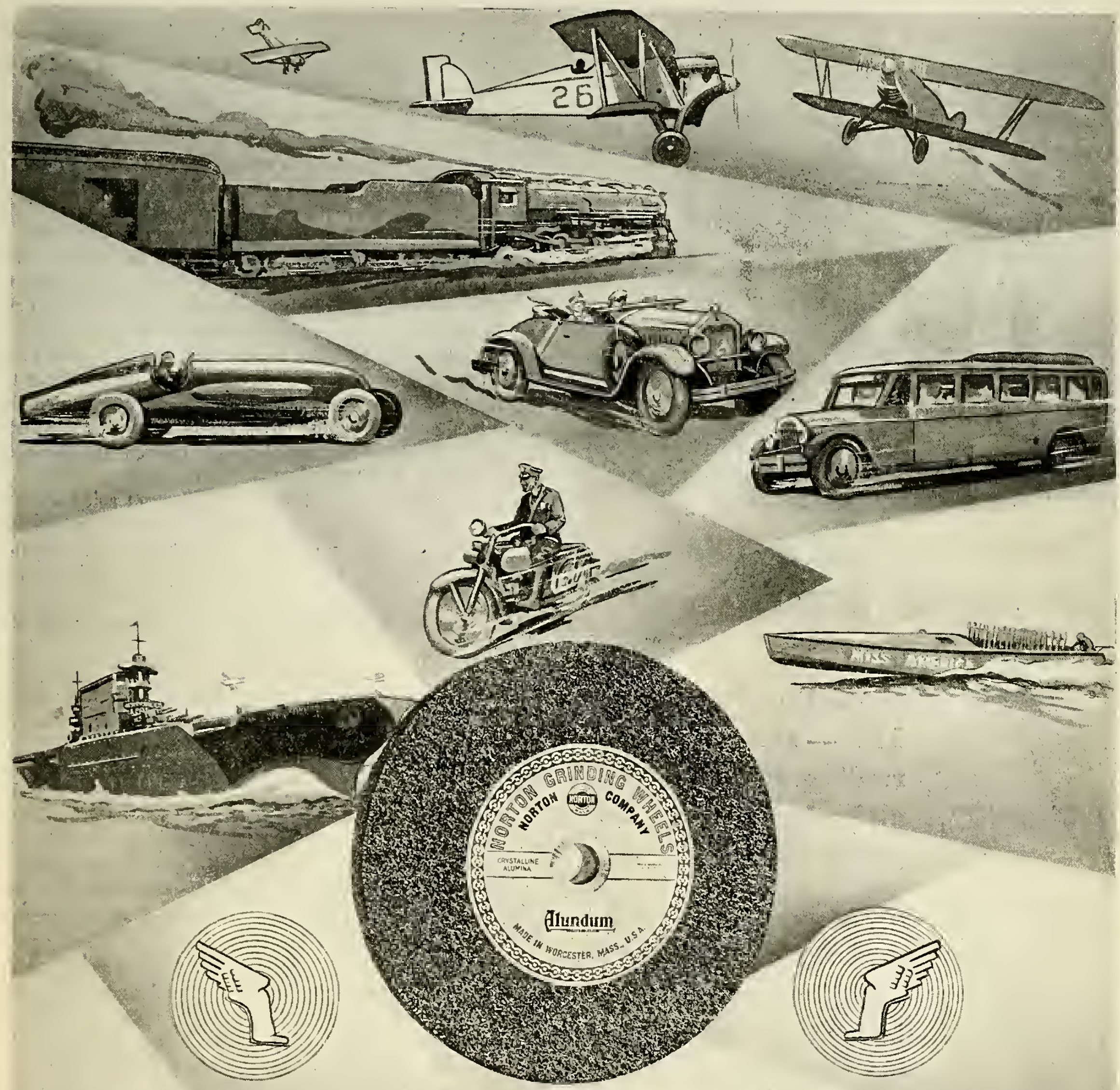
In truth those Army Air Corps men did something very much worth while. It ought to wake the nation up. They demonstrated completely the necessity for air defense.

But that was not the real achievement of the episode. What the boys had done with bombs was nothing to what the infuriated oldsters promptly did with the first weapon they could grab. Out of a clear sky, more mysteriously than the boys' bombs, dropped on the nation through its newspapers, a few days later, a great publicity attack explaining how and why in actual warfare nothing of the sort accomplished by the boys from Dayton possibly could happen. Good work, old-timers! That publicity was handled with a skill that got it double-column headlines in newspapers that pride themselves on knowing what is REALLY what. It takes magnificent lying to fool the bigger newspapers.

"Our anti-aircraft guns would have been functioning, in actual war," these apologists for the old arms bleated, ignoring the lessons of the World War.

A second broadside from the frightened old-line apologists (the Army denying its own child: the Army Air Corps—a strange phenomenon) declared that $15,000,000 would be used at once for ground defenses to protect our cities from air invasion. The European cities spent many times as much to protect themselves long years ago, before

(*Continued on next page*)



The Age of Speed — and Grinding

Man's conquest against time no longer astonishes the world. In this machine age, we accomplish in minutes the work that a few years ago required hours.
Speed in machine production, in transportation, in building and agriculture has come to be almost commonplace.

And to make high speed possible, fast moving parts of vehicles and machines must be made to watch-like standards of accuracy—accuracy made commercially practicable by the modern grinding machine and grinding wheel.

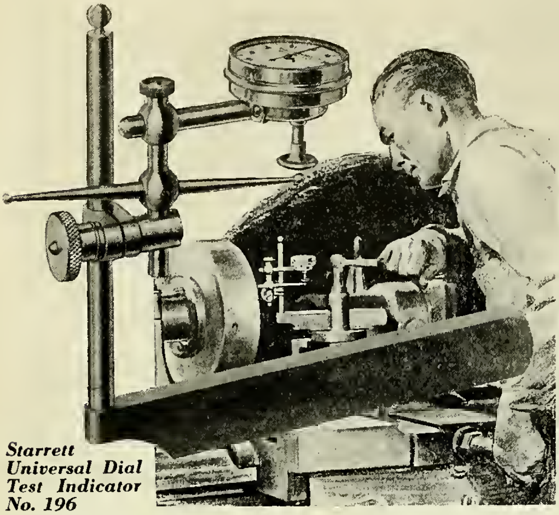
The part that grinding plays in our life today is most unusually portrayed in a motion picture film, "The Age of Speed." Suitable for meetings of civic clubs, engineering societies, industrial organizations. Loaned upon request.

NORTON COMPANY - - - Worcester, Massachusetts

NORTON

Grinding Wheels
Grinding Machines

Refractories-Floor
and Stair Tiles

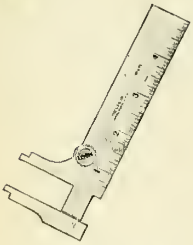


Starrett Universal Dial Test Indicator No. 196

"Sensitive as a cat's whisker"

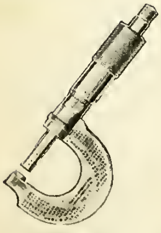
Starrett Thickness Gage No. 172

That's what you'll like about this Starrett No. 196 — sensitive, easy reading, adjustable dial, and adaptable to any position or work.



Starrett Pocket Slide Calipers No. 425

From checking a crankshaft for true running to turning down a bushing in a lathe you'll find this tool will save time and effort and help you do better work.



Starrett Micrometers No. 230

Let us send you the free Starrett Catalog No. 24 AD describing over 2500 Starrett Tools.

THE L. S. STARRETT CO.
World's Greatest Toolmakers
Manufacturers of Hacksaws Unexcelled
Steel Tapes—Standard for Accuracy
ATHOL, MASS., U.S.A.

Use Starrett Tools

2966

(Continued from preceding page)

aviation had one-third the kick that it has now, and had, as evidence of the protection which they got, the grim duty of burying their dead, most of whom were children, with almost all the balance women. Then they spent hurried millions to cover up the wounds inflicted on their railway stations, residential districts and what not. Ask Europe just how many actual enemy aircraft its ground defenses really brought down. Europe, if truthful, will answer: Not a single one. Air-raids were not combated until air-attack was met by air attack. And even then the planes were never really checked although the lumbering Zeps, full of inflammable gas, were thoroughly defeated.

The worst part of all this nonsense is that most newspapers and nearly the whole public actually believe it. That is a real danger. Such propaganda is not far from criminal. The people think our Army heads are on their toes and ready, with a plan and an appropriation (which does not exist), to protect our cities easily from every form of air attack by methods which were proved to be absurd during the World War.

The denial that any millions had been set aside to spend for anti-aircraft defense of cities was sent out from Washington a few days later and in such a way that it was given four lines or maybe five by the newspapers which had devoted columns to the first false nonsense.

It is a little nauseating. It is not straight dealing with the public.

IN the field of aeronautical publications we have several charming little friends whom we love to see at innocent play and whose prattle is engaging, even though it may lack wisdom, or even fact foundation. The latter is the case with a double-leaded solemn and apparently profound announcement in *Aviation*. It would be wholly interesting were it not entirely wrong:

"The Department of Commerce has decreed that all planes shall come out of a spin in three-quarters of a turn after having made six turns. . . . This safety measure which has been adopted by the Department is distinctively open to controversy. . . . It is easier to pass safety regulations affecting design than it is to repeal them, and it will not be long before the civil handbook controls commercial airplane design as thoroughly as the Army and Navy handbooks control military design. Such a condition would in our mind be deplorable."

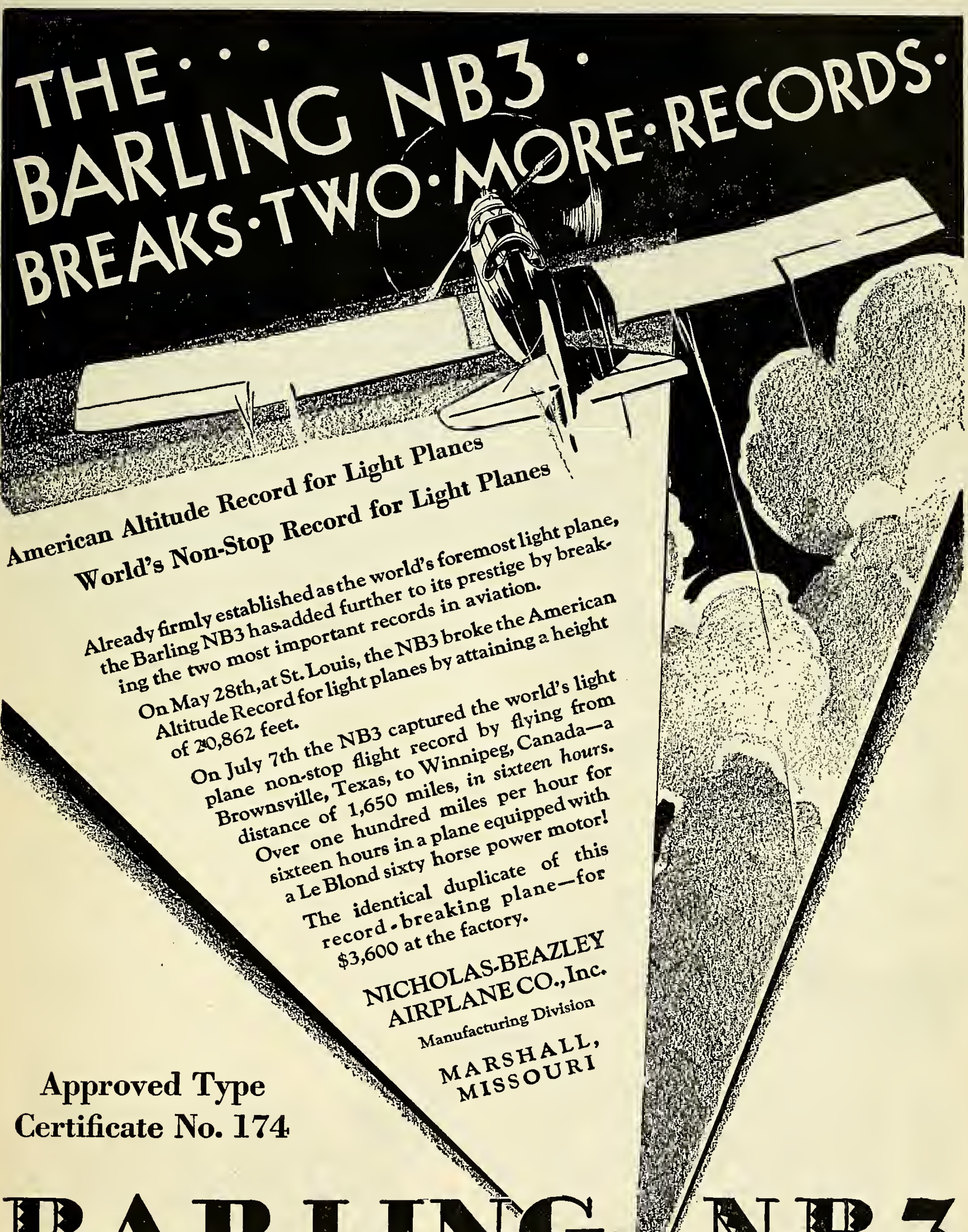
This would be all right if, for instance (to take but a few of the numerous reasons why it isn't), the Department of Commerce actually had *"decreed* that all planes shall come out of a spin in three-quarters of a turn after having made six turns." It hasn't. Spins alone never have been the reason for refusal of approval by the Department. When, combined with other defects, they have influenced toward adverse official judgment, the manufacturer always has been mighty glad to make corrections and has produced a more satisfactory ship as a consequence, and said so. *Aviation's* statement that the Department's regulation is "open to controversy" might be more impressive if there were such a regulation.

Aviation makes no reference to those spins by planes under test started at two thousand or more feet and continuing until earthly contact brings them to a sudden end, while the pilot, it is to be hoped, lands a little later in a parachute.

Fortunately, such episodes as this, which occur during test flights, usually get as little publicity as the spinning

(Continued on next page)

THE . . . BARLING NB3 . BREAKS · TWO · MORE · RECORDS ·



American Altitude Record for Light Planes

World's Non-Stop Record for Light Planes

Already firmly established as the world's foremost light plane, the Barling NB3 has added further to its prestige by breaking the two most important records in aviation.

On May 28th, at St. Louis, the NB3 broke the American Altitude Record for light planes by attaining a height of 20,862 feet.

On July 7th the NB3 captured the world's light plane non-stop flight record by flying from Brownsville, Texas, to Winnipeg, Canada—a distance of 1,650 miles, *in sixteen hours.* Over one hundred miles per hour for sixteen hours in a plane equipped with a Le Blond sixty horse power motor!

The identical duplicate of this record-breaking plane—for $3,600 at the factory.

NICHOLAS-BEAZLEY
AIRPLANE CO., Inc.
Manufacturing Division

MARSHALL,
MISSOURI

Approved Type
Certificate No. 174

BARLING NB3

Monoplane

SOARING TO NEW HEIGHTS OF POPULARITY!

THE experienced airman buys a plane for value received, not merely value advertised. He carefully weighs such qualities as safety, comfort, stability and ease of operation. He chooses that ship which combines these features to the greatest possible degree.

Perhaps that is why the AIR BOSS is soaring steadily to new heights of popularity. Every single part—from tail skid to wing tip—is built to endure, and to deliver that same rugged stamina which pilots have learned long ago to expect of the

AIRBOSS

The cockpit of the AIR BOSS enjoys an extremely wide range of vision, is thoroughly protected against eddies or drafts, and offers dozens of modern air conveniences to AIR BOSS owners.

Another unusual feature of this plane is its direct aileron control, without wires, pulleys, horns or rods. This remarkable system adds greatly to the general accessibility of the control units. Write for descriptive booklet of the AIR BOSS. You will be interested in its many other distinctive features. Prices vary with engine installations.

SOUTHERN AIRCRAFT CORPORATION
BIRMINGHAM, ALABAMA

(*Continued from preceding page*)

plane's owner can arrange. Perhaps *Aviation* will agree that the Department is justified in such corrections of design as may be possible before planes performing thus are officially approved.

We know the Department and we don't know *Aviation* very well, but we are sure that the Department will be right glad of any criticism which will help it add to safety in American aviation. But suggestions based on fact are so much more likely to be useful to our hard working, conscientious friends down in Washington that they would be rather more grateful for them than they probably have been for this one.

EUROPEAN FLYING IMPRESSIONS

(*Continued from page 62*)

employees on the fields. That accounts for much of the development in factories. We were in Germany during the reparations conference in Paris. While we were there the Germans lopped thirty million marks from the army budget, and vast sums from the Luft Hansa. They were just playing good poker. It would be pretty hard to plead poverty and be spending large sums on maneuvers and airline extensions.

But the people do not scheme war. They hope that their peace-time airplanes can prove of some defense in case their security is questioned. It is my conviction, and I had a chance to get to know many Germans, including former soldiers and officers, that Germany is fed up on war. But I did hear such talk as that France, being allied to Jugo-Slavia which was at swords' points with Italy, might find herself suddenly at war with Italy via Germany. And the Germans fear a war fought on German soil.

Several European airports used flocks of sheep as lawn mowers. And most of them have fences to keep the general public off and out. One of the best things I saw, which can be used everywhere in this country at no great expense, was the use of smoke on the flying fields for wind indicators. They have smoke cones which burn a chemical giving off white smoke. Or they use a common smoke candle. You can refill the holders and stick a new one in the ground as the old one burns out. When one realizes how many American fields have spent good money for these rigid wooden or metal wind indicators which always point in some direction, even when there isn't any wind at all, it seems too bad. Even a wind sock, which, if it is soft enough, can hang limp or stretch taut with the wind conditions, is inferior to smoke. Smoke trails out across the field and shows you velocity as well as direction and

(*Continued on next page*)

SAFETY AIRCRAFT
TIMM
1911

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TIMM AIRCRAFT CORP. 901 No. San Fernando Rd., Glendale, Calif.

The New

WRIGHT WHIRLWIND J6 Series

afford an excellent opportunity for a design and engineering department to meet the increasing public demand for greater speed, greater maneuverability and greater comfort. How well these demands have been met by the Stearman Aircraft Company is soon to be announced. Wait until the four new Stearmans land. , , , ,

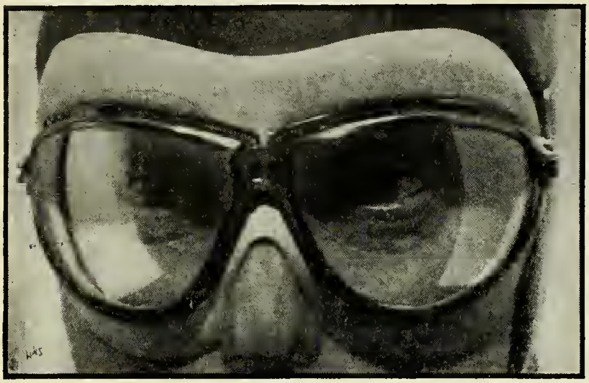
STEARMAN
AIRCRAFT COMPANY
WICHITA KANSAS

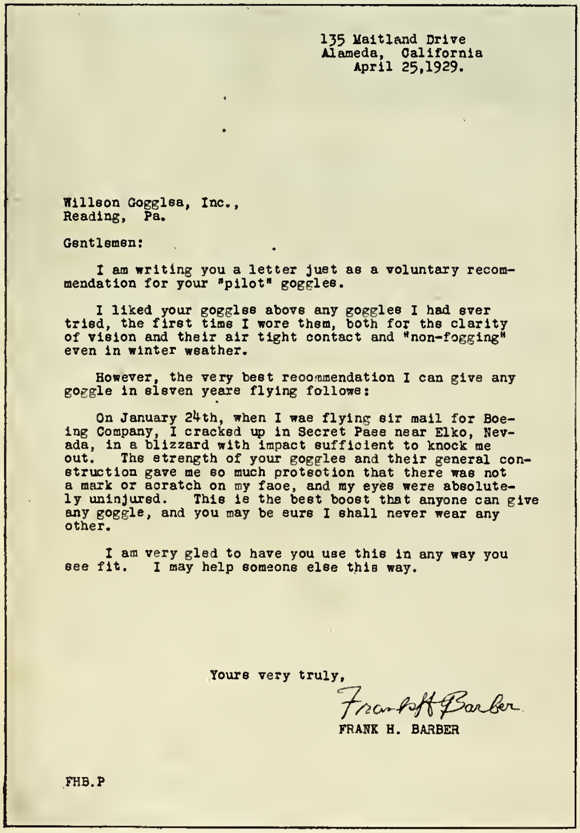
A Stearman sales franchise
is something to be desired

The Stearman Aircraft Company
WICHITA, KANSAS

"NO BETTER NAME IN AIRCRAFT"

MADE
to protect your life—
WILLSON GOGGLES





135 Maitland Drive
Alameda, California
April 25,1929.

Willson Goggles, Inc.,
Reading, Pa.

Gentlemen:

I am writing you a letter just as a voluntary recommendation for your "pilot" goggles.

I liked your goggles above any goggles I had ever tried, the first time I wore them, both for the clarity of vision and their air tight contact and "non-fogging" even in winter weather.

However, the very best recommendation I can give any goggle in eleven years flying follows:

On January 24th, when I was flying air mail for Boeing Company, I cracked up in Secret Pass near Elko, Nevada, in a blizzard with impact sufficient to knock me out. The strength of your goggles and their general construction gave me so much protection that there was not a mark or scratch on my face, and my eyes were absolutely uninjured. This is the best boost that anyone can give any goggle, and you may be sure I shall never wear any other.

I am very glad to have you use this in any way you see fit. I may help someone else this way.

Yours very truly,
Frank H Barber
FRANK H. BARBER

FHB.P

Willson Products, Inc.
Aviation Division
239 Washington Street
READING, PENNSYLVANIA

(*Continued from preceding page*)

local surface vagaries of the wind. If a smoke candle is burned in the center of a circle in the runways, no pilot can miss it or need waste time trying to find the wind cone on a hangar some place.

European night flying of passengers is limited still to the Luft Hansa Berlin-Hanover and Berlin-Königsberg runs. Berths have been built into some planes, but undressing and getting into an airplane bed is still an event of the ordinary air traveler's future. In the winter season and until May, the night runs were not operated. Similarly the great flying boat runs up to Copenhagen and the Scandinavias were not possible because of ice in the Baltic and North Seas. And the Russian services were shut down until spring rains and melted snows were gone from the flying fields in May. The trans-Alps services of the British and French likewise bow to the winter season.

The European pilot is the same sort of fellow who flies over here. He is a wonderful, generous, capable chap. No matter what language he speaks you can sputter along in air language and understand him. He is interested in what we are doing in America. But he is not jealous, and he's glad to talk and show you what they've got in Europe.

THE BIG IDEA

(*Continued from page* 63)

for every one who can tell you whether there is regular passenger service by air out of Cleveland for points west. There are thousands who will tell you that it isn't safe to fly westward across the Atlantic for every one who knows that it *is* safe to cross the continent in a trimotored transport.

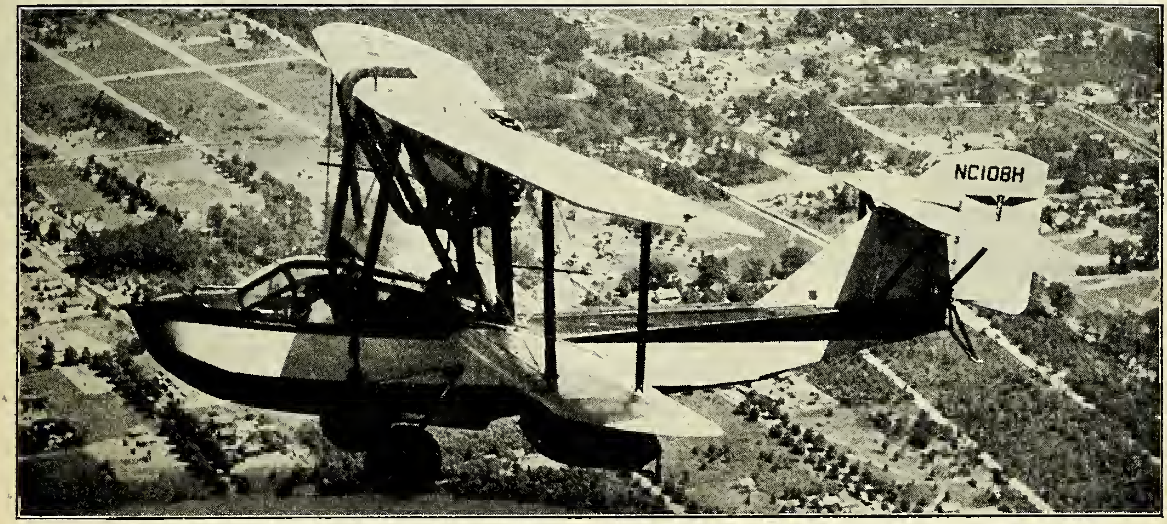
The public doesn't discriminate. It doesn't get a chance to discriminate. The daring, dangerous and useless stunts unfortunately get on the front pages, in company with flagpole sitters, bunion derbies, and people who push peanuts up Pike's Peak with their noses. It is such stunts that shake down the tragedies; it is such stunts that emphasize all the useless things an airplane can do. It is such stuff that is shaking public confidence just when aviation most deserves it and most needs it.

What else? Well, there's the little matter of the fundamental difference between a five-mile hop around a lot of hay fields and a trans-oceanic trip. To the dear old public an airplane is just an airplane, little or large, and with one or more motors according to the generosity of the designer. When an airplane sets out for Europe, and gets there or doesn't as the case may be, the average citizen considers the result as a personal hint to his air-minded conscience. Yet the same gentleman would hardly think of starting out for Europe in a row-boat, though a row-boat might be ample and adequate and indispensable for crossing the local river or a fishing expedition out on the lake. Aviation in general has to carry the blame for a lot of false starts and sad flops in particular. When the "contemplating" season is on,—which is the season when the Atlantic seaboard is lined with planes and pilots contemplating a flight to Europe,—every failure is chalked up against the account of the industry. It is a sort of revival of the good old days when every decrepit old Jenny, tied together with string and haywire, which turned up her toes and died a natural death, was accounted an argument against the future of aviation.

Yet these are not arguments, for any champion of aviation can take a fistful of figures of safe and sane operation and make the skeptic eat them. But they do represent a

(*Continued on next page*)

A thousand Airports . . .
Ten thousand Waterways . . .
are HOME to the Ireland Amphibion



TO forest-hemmed lake . . . to inland port or sea-coast resort . . . to anywhere you wish to fly! . . . Destinations are limitless with an Ireland Neptune Amphibion.

Equally at home on land or water, the Neptune literally carries its airports with it. It is a luxurious Air Yacht of the most advanced design . . . the embodiment of aviation's latest refinements.

Its remarkable flexibility, sturdiness, reliability and speed are the result of many years pioneer experience in designing and constructing flying boats and amphibions.

Its light all-metal hull—its comfortable, open or closed, 5-place cabin—its ample storage space—its inherent stability—its 480-mile cruising range—make the Neptune the ideal ship for every purpose.

Whether you fly for business or for pleasure makes no difference—the Neptune will answer to every demand you make of it.

See it . . . fly in it . . . ask pilots who have learned what it can do.

You can learn about it at the nearest Curtiss Branch . . . any one of the forty that blanket the country with Curtiss service. Or write for information.

The Neptune is unusually sensitive to control. It lands easily at moderate speed and takes off quickly on both land and water.

• • •

Ireland Aircraft, Inc.
Curtiss Aeroplane and Motor Co., Inc.
Curtiss-Robertson Airplane Mfg. Co.
Cessna Aircraft Co.
Command-Aire, Inc.

DEPARTMENT 6, 27 WEST FIFTY-SEVENTH STREET, NEW YORK CITY, N. Y.

CURTISS FLYING SERVICE

"World's Oldest Flying Organization"

PILOTS
like em!

U. S. Patent No. 1,705,879. Foreign Patents Pending

SCULLY
Air-Mail
HELMET
5 *exlusive features*

1. A snug, tailored fit around the forehead and face and under the chin.
2. A "cupped" effect that never pulls out of shape and provides a comfortable place for the ears.
3. "Windwings," with elastic edges protect the face against the toughest gale.
4. Our special method of binding puts the strain exerted by the pull on the chin-strap only on the outer edges of the helmet, thus assuring a windtite fit—always.
5. A reinforcement feature which stops, at last, that annoying wind-flutter on top of the head.

girls adore these

LADY LINDY Helmets—the latest, newest, aviation sports helmet. Hand-made, specially tailored of soft, pliable African cape glove leather, silk lined. For flying and other sports wear. Made in small, medium and large sizes. May be obtained on special order only.

Altogether, Scully Helmets are of unusually fine workmanship, primarily designed to render superlative service.

Scully Helmets are made in various styles and weights.

Distributors for U. S., Denver, East
NICHOLAS-BEAZLEY AIRPLANE CO.
Marshall, Missouri
For Sale in the West by
WESTERN AUTO SUPPLY CO.
And the Better Men's and Sporting Goods Stores
Mfd. by SCULLY BROS., INC., Los Angeles, Calif.

(Continued from preceding page)

revival of the old psychological hazard which the industry set out to slay these many years ago. Too much attention is focussed today on airplanes trying to do what they were never intended to do, or to do things which aren't worth the trouble. If an airplane started tomorrow to fly through a coal-mine or make an outside loop beneath the Brooklyn Bridge, there would be enough reporters and photographers on hand to cover the day of judgment.

What's the big idea? The big idea in the present situation is to call off some of the sideshows and get down to business. The big idea is to concentrate our air-minded enthusiasms, rather than to spread them wherever there is space in the sky. The big idea is to build business rather than to beg for newspaper space. The big idea is to choose a job and go to work.

For the big idea in operation, see the Department of Commerce in all its aeronautical sidelines. There's no nation in the world can match the accomplishments of this organization. Consider the air mail. There was a job to be done and a dream to be realized. It meant a lot of work and worry and money, and a sort of concentration that would survive the excitement of the beginnings. It meant the keen coöperation of governmental authority with business experience, and a slow campaign of public education. It meant that a lot of work had to be done quietly, so that no alarmists and short-sighted economists should throw monkey wrenches until the work was well under way. The monument to the idea can be seen in the air mail map, which looks today like the work of an ambitious and industrious spider.

The steady polishing and perfection of the regulations of the Department also reveal the big idea. Read 'em. They are at work on the idea that some planes are good for one thing and some for another and some for nothing at all, and that the same goes for pilots. They are hammering at the idea of safety and sanity in operation, no matter who squeals in the meantime. They go a long way with any sound scheme of aeronautical development, but they sell no tickets for the circus. And they don't say a word about the rules and regulations for trans-oceanic flying, for the very good reason that commercial aviation has plenty to do in its own backyard without playing ducks and drakes with old Father Neptune.

The big idea is also at work in the campaign of the Guggenheim Foundation and other folk of the same air-minded persuasions. It appears in their efforts to take every town and city into the scheme of American commercial aviation, so that every worth-while community will have a place on the air-map and a single system of regulation and control will govern all air traffic. It appears in their insistent urging of speed, safety, comfort and economy as essentials of commercial operation. It appears in their encouragement of all sincere effort and their discouragement of everything that smells a little sour around the edges.

There's also the big idea at work in the latest outburst of evolution whereby the railroads suddenly put on wings. The specific name of this species of the big idea is Coördinated Transportation, which is an old and tested principle which has gone into a new incarnation. It is working very prettily now that the new boats built in Europe are making tracks across the Atlantic. By way of wings, wheels, rails and ships the traveler in a hurry can make it from Los Angeles to London in a week, which—if you ask me—is something.

There's a big idea in the defense program, and a bigger

(Continued on next page)

Jim Kelly didn't "wait until tomorrow" . . .

THE world-famous Jim Kelly, who, with Reg Robbins blazed the trail for endurance fliers in Commercial air craft—proved to airline operators and an air-conscious public the value of T-A-T training. *Kelly proved that T-A-T Graduates have more than flying hours, have more than "theory," have more than training.* He proved to careful operators what they have long known, and to a cautious public, that T-A-T graduates have that "priceless ingredient" . . . *experience* as a part of their training. The sort of experience that made it possible for Kelly to meet every emergency—to take his turn at the stick—to journey confidently out on the flimsy catwalk to grease the rocker arms and make delicate engine adjustments as the propellor grazed his belt. When Jim Kelly, a former T-A-T Flying School student, blazed this trail he proved the value of T-A-T training!

"Cowboy" JIM KELLY, *who gained world fame as a great flier and mechanic less than a year after he enrolled at T-A-T.*

Operators and the Public Demand Thorough Training

It is training such as Kelly received that operators and the public demand of its pilots to carry the U. S. mails, express and precious human freight. Earn a T-A-T diploma and you carry with you the confidence of operators and the public. T-A-T is the private school of one of the nation's largest airline operators. T-A-T is the school that produced many of the pilots, mechanics, field men and executives who have made possible the marvelous record of the five related T-A-T companies . . . a record of more than one million, five hundred thousand air miles without loss of a single piece of mail or injury to passenger or pilot!

Only Thoroughly Trained Pilots Need Apply

You must have thorough training if you want to make good in Aviation. For neither operators nor the public will guess at your ability. They MUST be sure that you are thoroughly trained. Your T-A-T diploma will prove that—will prove that you have had the same thorough training that Kelly had. Only the most thorough, the most complete, the most painstaking instruction could have made possible Kelly's record. And Kelly was green—*he did not know the feel of a stick less than a year before the flight!* That's thorough training.

You Can Get the Same Thorough Training Kelly Had

The training that made Kelly the pilot and mechanic that he is, is open to you at T-A-T. Veteran Pilots will teach you the tricks of the trade, just as they taught them to Kelly. The same Licensed Mechanics will supervise your mechanical training. You will be one of a small class, just as Kelly was. Your instructor will be your friend and you will receive the same personal instruction Kelly received. You will meet Jim Kelly, a member of the T-A-T family, and talk to him frequently. You will train in new, safe training planes—and they are many and varied—just as Kelly did. You will be in close touch with the same opportunities that were open to him in the heart of important commercial aviation activities. You will get *experience* as you learn. And with your diploma there will be a prestige that money cannot buy . . . only thorough training will earn it for you.

HANK KILLHAM another cowboy whose thorough training at T-A-T makes him a valuable executive in the New Orleans division of Southern Air Transport, Inc., a related company.

Take the Step Jim Took—Take It NOW

If Jim Kelly had "waited until tomorrow" to write for our book, he may not have been the world famous flier he is today. He had decision, and took the first step. You too should take your first step TODAY, and write to T-A-T Flying School, just as Jim Kelly wrote little more than a year ago. Our illustrated 32-page book, "Flying the Golden Trail," may bring you fame and fortune equal to Jim Kelly's. It may not. But it will surely show you the way to a position in Aviation that will bring you the admiration of all your friends and a high salary as well. Send the coupon TODAY. "Flying the Golden Trail" is free.

T-A-T Flying School, Inc.

Fort Worth Dallas Houston San Antonio Amarillo New Orleans Atlanta

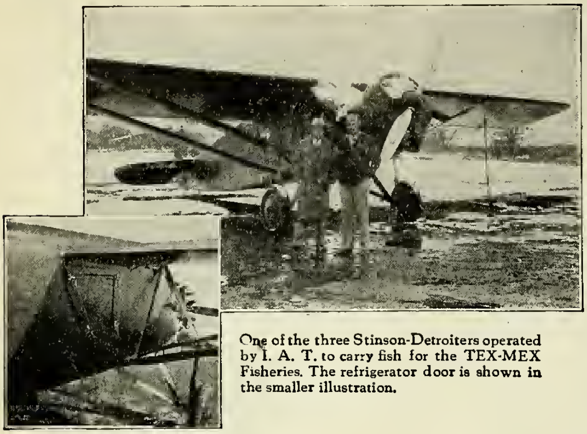
---

T. A. T. Flying School, Inc.,
626 Fort Worth National Bank Building,
Fort Worth, Texas

I'd like to know how I can take the same courses which gave Jim Kelly his training and flying experience.

Name.. Age..

Address...... Occupation ....



One of the three Stinson-Detroiters operated by I. A. T. to carry fish for the TEX-MEX Fisheries. The refrigerator door is shown in the smaller illustration.

FLYING REFRIGERATORS
Insulated with Balsam-Wool

From the fisheries on the Soto La Marina River in Mexico to the railroad at Brownsville, Texas, is 180 miles air line. The roads are well nigh impassable to motor trucks. So the Tex-Mex Fisheries take their fresh fish out *via plane.*

Two trips a day is the schedule—southbound with 1000 pounds of ice, northbound with 1200 pounds of fish. A remarkable commercial development of airplane service.

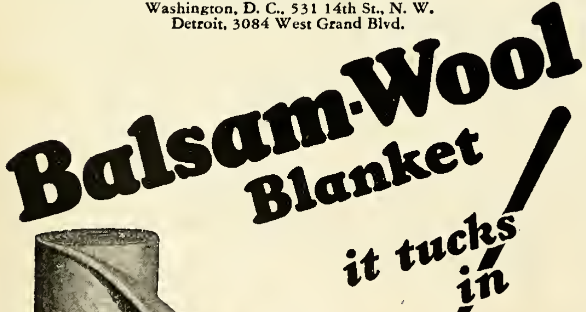
The refrigerators in the planes are insulated with Balsam-Wool—of all materials the best adapted for the job because of its high insulating value—its extreme lightness and its flexibility.

The same qualities—plus the remarkable *sound deadening* ability of Balsam-Wool and its *fire-safeness* are responsible for its wider and wider use as a cabin insulator for passenger planes.

Write for complete information.

WOOD CONVERSION COMPANY
Insulation Division—Weyerhaeuser Forest Products
Mills at Cloquet, Minnesota

Industrial Sales Offices:
Chicago, 360 N. Michigan—New York, 101 Park Ave.
Washington, D. C., 531 14th St., N. W.
Detroit, 3084 West Grand Blvd.



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one in the public's determination that the Army and Navy should quit matching pennies and attend to it. We know what we want, and we know it can be done,—and that's the big idea. Focus the attention of the public on it instead of on the parachute-jumpers down at the Navy Yard, and we can have a Department of National Defense, with airplanes and everything, before the Navy Department gets through deciding how big is a cruiser and how long is a yardstick.

There are plenty of designers, manufacturers and operators who have the big idea. The autogiro looks like one angle of the big idea, since it promises to develop into the backyard plane which all the commuters are waiting for. The gent who owns it in this country has just dropped all his other frying pans in order to do this one job up brown, and he deserves all the luck he can lay hold of.

Then, for instance, there's this dainty little three-story Dornier, which has as many engines as an ordinary transport has passengers. There has been a lot of talk of airliners, but this is the first ship that looks the part. The gentleman who made her had a big idea when he risked his reputation in building something big enough to sneeze at winds and weather over any land or sea. When that thirty-seven ton truck crosses the ocean it will look so easy that everybody will be wondering why somebody didn't do it sooner.

The big idea of today is to pick your job and plug at it. whether you are a down-at-heel journalist like myself or a manufacturer of aircraft with a dozen mergers snapping at your heels. Aviation is sobering down to this stage of development, even though the public doesn't know it as well as it should. Those of us who care should carry a chip on the shoulder for all who accuse aviation of being principally sensationalism and exhibitionism. We should take those who mean well but don't know any better carefully in hand and show them the error of their ways. Most of them are looking in the right direction, but they don't see the right things.

HOT WEATHER FLYING

(*Continued from page 76*)

carbon deposit (oxidation products) than does mineral oil and also causes the formation of a gummy deposit in the crankcase.

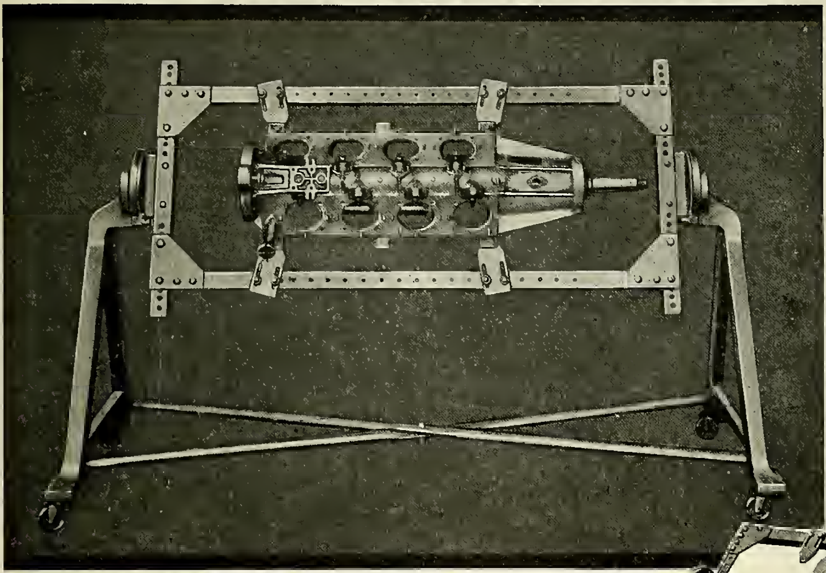
A thorough analysis of the lubricating systems of aviation engines with all their peculiarities of design reveals the fact that there are two ways of carrying the lubricating oil supply for aircraft engines; i.e., the wet and dry base systems. In engines where a wet base system is used, the entire supply is carried in the sump, in the same manner as in the force feed systems of automobile engines. In dry base systems the entire oil supply is carried in a tank separate from the engine but directly connected to it through inlet and outlet tubes.

The advantages of the dry base system over the wet base system consist in the better cooling of the oil, the separation of sediment from the oil in circulation and the prevention of excessive lubrication of the cylinders and pistons during flight.

The extraordinary maneuvers described by airplanes make it a matter of vital necessity that the operation of aircraft engines be as nearly consistent as possible at all angles of inclination,—in vertical as well as up-side-down positions. To meet this situation lubricating systems have been elaborated so as to deliver an abundance of oil to all parts to be lubricated and to carry off excessive friction

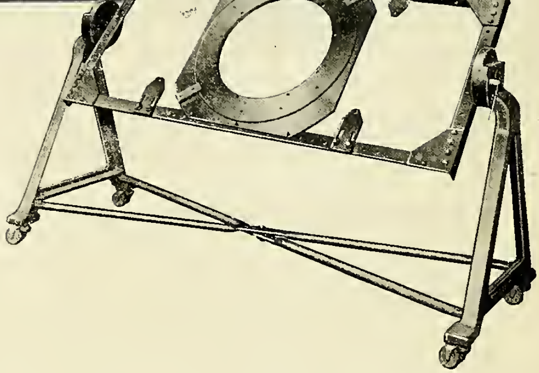
(*Continued on next page*)

Cut Down Your Overhaul Time



At left Lipe Motor Stand is shown with OX5 Motor. Note slotted brackets which permit accurate angular adjustments. In-line motors are similarly handled.

Below you see the stand with rotating plate for radial type motors. Motor may be revolved on two axes and clamped in any desired position.



for Every Type *of* Motor

THE Lipe Airplane Motor Stand is a necessary piece of equipment that greatly adds to the speed and efficiency of tearing down, assembling, repairing and overhauling of airplane motors. The Lipe Motor Stand is of universal type and handles in-line, V-type and radial motors to equal advantage in sizes from 60 to 600 hp.

The frame is adjustable for width and length. It swings freely in a complete circle and may be locked in any position by a hand clamp.

Diagonal leg braces provide unobstructed standing room. Double swivel casters mounted on ball bearings facilitate easy moving from place to place even when carrying the heaviest motor. Standard equipment includes one rotating adapter ring for any specified radial type motor, and brackets for any in-line or V-type motor. Additional adapter rings for other radial motors can be supplied.

Write Now For Full Details.

GENERAL AVIATION CO., Inc.
Sales Agents
Hotel Syracuse Building, Syracuse, N. Y.
ELMIRA, N. Y. GENEVA, N. Y.

LIPE
AIRPLANE MOTOR STAND

ANOTHER WONDERFUL FLIGHT ENDURANCE RECORD

made by Reinhart and Mendell in their biplane "Angeleno" powered with a single Wright Whirlwind engine on which Scintilla Aircraft Magnetos are standard equipment.

SCINTILLA
Aircraft Magnetos

have again proved their stamina in this record-making flight, emphasizing more than ever their *dependability*.

The record of the gruelling flight of the "Angeleno" speaks convincingly of the thoroughness with which each Scintilla Magneto is inspected and tested before leaving the plant.

They are selected because of their:—

Dependability Simplicity Accessibility

The majority of modern American Aeronautical Engines are equipped with Scintilla Aircraft Magnetos.

Scintilla Aircraft Magnetos can be obtained for engines of from one to eighteen cylinders.

SCINTILLA MAGNETO CO. INC.
SIDNEY — NEW YORK
Contractors to the U.S. Army and Navy

(*Continued from preceding page*)

heat. The force feed lubricating system is applied to aircraft engines and distributes oil under considerable pressure to all friction points.

The force feed system in wet base engines differs in no special way from the same system applied to automobile engines. In dry base engines the oil issuing from the bearings drains down to the suction side of a second pump located in the bottom of the base chamber which tapers from each end toward the center. This pump, which forces oil to the bearings, prevents the accumulation of oil in the crankcase and forces it from the crankcase to a separate oil reservoir and cooler. From the secondary reservoir the oil flows back in rapid circulation to the pump feeding the bearings. With this arrangement positive lubrication is entirely independent of engine position.

The capacity of force feed pumps in aircraft engines varies between 1½ and 2 gallons per minute. In long spiral glides at a high angle, or in long vertical nose dives from an altitude of from one to two miles with the engine pulling at full throttle, there will thus be an accumulation of perhaps several gallons of oil in the crankcase even of the dry base engine, but this quantity will not usually exceed one-third of that carried in the sump of a wet base engine. At present the dry base engines appear to be more adaptable to aviation uses.

A considerable percentage of the difficulties most frequently encountered in hot weather flying may be eliminated by understanding the lubrication of your particular engine and selecting the proper lubricant; by keeping a close watch on oil temperature and oil pressure; and by using an air thermometer to determine the part played by changes in air temperature upon the proper cooling of your motor.

AIR-RAIL AND THE T. A. T. SYSTEM

(*Continued from page 65*)

part of the country with which they are familiar. The required time and record of the second pilots is almost as imposing, and two of the most beautiful landings made during our trip were made by the assistant pilots. Each plane has a crew of three, the third member being a courier. Although this young man's duties are mainly those of a steward, he also is expected to have some first hand knowledge of aviation, and many of the couriers on the line have at least a private flying license. Certainly nothing could be more nearly ideal in the matter of flying experience than the T.A.T. corps of pilots. My hat is off to Major Thomas Lanphier for the work he did in selecting these men. But while it is off I should like to remark also, that Tommy's most impressive accomplishment lies in the fact that, though most of these men are Army-trained pilots, he has gotten them all (I don't know how) into something that looks mighty like a Navy uniform.

The westbound flight on the first day is scheduled to begin from Port Columbus at 8:55 o'clock in the morning. At just 8:55 the wheels of the Ford monoplane *City of Wichita* left the runway, and we were on our way to Indianapolis. The cities on the schedule were clicked off with machine-like regularity. Maintaining an average speed of 110 miles an hour, with the three Wasps doing their stuff in prescribed fashion, and with brief stops at Indianapolis, St. Louis, Kansas City and Wichita, with luncheon on board the plane, we landed at Port Air, the Waynoka field stop, at 6 o'clock in the evening, on time to the minute.

From Port Air we had a short trip to the Waynoka rail-

(*Continued on next page*)

THERE ARE 300 ADVERTISERS IN THIS ISSUE

AERO DIGEST is the largest trade journal in the industry. It carries a greater volume of paid advertising than any other aeronautical trade paper in the world for almost twice as many advertisers. It is the one medium big enough and editorially powerful enough to cover the entire market without duplication and at a single cost. ¶ Exaggeration? . . . Not a bit. Count the number of advertisers in any other aeronautical publication and subtract the total from AERO DIGEST's 300. You'll find that AERO DIGEST contains practically 100% more; as much, surely, as any two magazines combined. ¶ Circulation? . . . Distribution? . . . The most thorough penetration of the 75,000 people earning a living in the various branches of the business and in the military services.

SPACE BUYERS

DETERMINE for yourselves the logic of AERO DIGEST'S *claim to supremacy among the aeronautical trade papers by checking the names in the Index of Advertisers on page 295 of this issue with a list of the Aeronautical Chamber of Commerce Members. The Chamber represents the backbone of aeronautical enterprise . . . the richest market, and when you sell the Chamber you sell the cream of the industry. No more complete coverage can be found elsewhere.*

▼

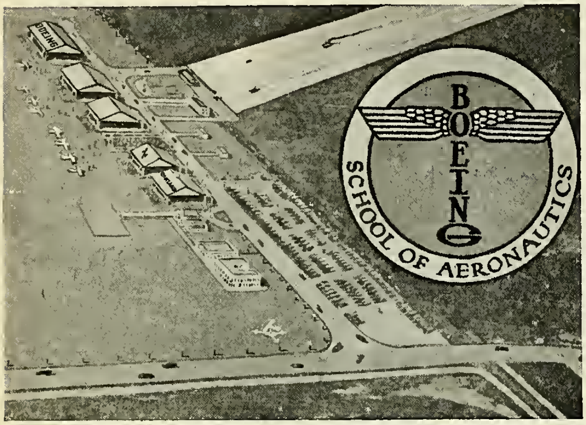
Without question, the buying tendencies prompted by the Cleveland Air Races and Show next month will be guided, in a large measure, by the advertising pages of AERO DIGEST. Capitalize on this opportunity to reach the best buyers . . . to add to the prestige of your advertising the influence and weight of AERO DIGEST'S Annual Air Race and Show Number.

Final forms for the September Show Number will close August 17th. Copy received early in the month will receive the preference in the matter of position. Make your space reservations now.

AERO DIGEST

220 WEST 42nd STREET, NEW YORK CITY

BOEING SCHOOL of AERONAUTICS
First University of the Air!



Famous Oakland, California, Airport, campus of Boeing School of Aeronautics, new University of the Air. CLASSES OPEN SEPT. 16th. Ideal year-round flying conditions.

HERE is the First University of the Air—a school for the man who wants not only instruction in flying, but who wishes to fit himself for a career in this rapidly expanding industry, including executive responsibilities. Aviation, like every other business, is becoming a matter of organization and management. *At Boeing School, courses never offered before, or given only in a comprehensive way in universities, will be included in the curriculum.*

A Remarkable Backing!

The Boeing Airplane Company made planes that Boeing pilots flew on Boeing routes to establish a performance record in commercial flight of 5¾ million miles in two years. Boeing affiliated plants made the propellors, and engines, too. *And now Boeing School makes it possible for you to get superior training, both ground school and flying, with a background like this!*

Get complete information on the Boeing School of Aeronautics, which offers various courses, ranging from private pilot course to Boeing master ground and flying courses.

Send the coupon, or write, NOW, for full information!

BOEING SCHOOL of AERONAUTICS
Division of United Aircraft and Transport Corporation
Airport · Oakland · California

Coupon for Information

BOEING SCHOOL *of* AERONAUTICS, Dept. B, Airport, Oakland, California
I am interested in the Boeing School of Aeronautics course I have checked:

☐ Private Pilot *25 hrs. ground school. In air, 10 hrs. dual, 8 solo.*
☐ Limited Commercial *51 hrs. ground school. In air, 15 hours dual, 35 solo.*
☐ Transport Pilot *100 hrs. ground school. In air, 50 hours dual, 150 solo.*
☐ Master Pilot *Big plane flying. Open to transport license holders.*
☐ Master Pilot Ground School *Includes subjects given only in universities. 864 hours (lecture-shop) 18 subjects.*
☐ Master Mechanic *Training for manufacturing. Twenty-two subjects.*

Name and Street Address

City and State

(*Continued from preceding page*)

road station in the T.A.T. aero-car, a new and extremely comfortable adaptation of the trailer bus-car idea. A Pullman, which had been taken over from the Santa Fe by the T.A.T., was set out on the siding, and we went aboard right after a most enjoyable dinner in the Harvey restaurant at Waynoka.

After a cool and comfortable night aboard the Santa Fe, we left the train the next morning at Clovis, N. M., and after breakfast at the Harvey house there, we motored out to Air Port, the T.A.T.'s station at this point; and in short order and on time, we began our second day of flying and our last day of traveling.

On the southwestern section of this new system of transportation, we were particularly impressed with the extent of the new building work which T.A.T. has done. Not only are the fields beautifully finished, but each port is equipped with a modern and comfortable passenger station. Both the land and the flying equipment is of the very best, with one possible exception. We were not greatly thrilled by the much heralded two-way radio communication from plane to station claimed for the system. Pilots confirmed our observation regarding inability to maintain communication at all times. The radio equipment seemed a little as if it had been dumped aboard hastily and at the last minute. On our return trip, we were told that all the radio apparatus was to be overhauled, and no doubt by this time it has been greatly improved.

Being nearly fifteen minutes ahead of schedule when we reached Winslow, and with special instructions to the pilots, we set out to determine how long it would take to tie the Grand Canyon into this most remarkable airline. The mapped route for the system passes about fifty miles south of the canyon. We made a flight to the canyon and flew over the big gulch for a considerable distance. When we got back on our course at Kingman, we had done the Grand Canyon at a cost of only seven minutes over the scheduled time. This seems to me a rather remarkable tribute to the airplane and to the flexibility of an airline, particularly when it is considered that it takes a railroad traveler a whole additional day on a transcontinental trip to get a look at the canyon, and some railroads like the Boston and Maine and the Long Island Railroad never get there at all.

From the desert encompassed Kingman, it was a mere romp into Los Angeles and to the end of our journey at the Grand Central Air Terminal at Glendale, a suburb of Los Angeles. Again we were on time to the minute.

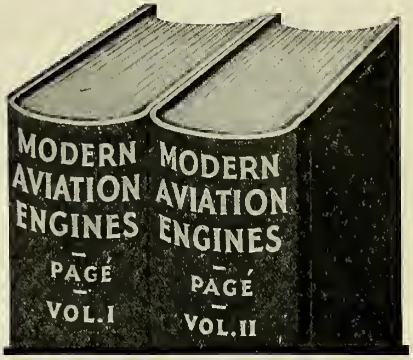
After a restful night at the Ambassador, our party pushed on the next day via the Maddox Air Lines to San Francisco, for lunch; and then in the afternoon we flew back to Los Angeles, where we started the return trip over T.A.T. the next morning. We were back in New York five days after we left the city, having covered 6,626 miles, 4,702 of them by air and the remainder by rail.

In the trial week of operation, prior to the formal opening of the line, planes and pilots of the T.A.T. covered more than 40,000 miles, without the slightest mishap. The only slip-up in schedule occurred on the last day of the trial period when the party coming from California missed the train at Columbus by thirty minutes. The fault was that of the Santa Fe, which that day was one hour and a half late in getting the air-rail passengers into Waynoka. The T.A.T. pilots did the best they could with the handicap, but in the relay flying across the Middle West they were able to make up only sixty-five minutes of the handicap which the dear old reliable and dependable railroads had handed them.

Save Weeks of Ground Work

with these two great new books

Here is the most complete information on all types of aircraft motors ever published in one treatise. Written by a leading instructor and authority for flying schools, pilots, field mechanics, shop men, engineers, students and beginners. A gold mine of necessary information for everyone, everywhere, in the aviation profession. A monumental work by a master instructor and pioneer aeronautical engineer.


MODERN AVIATION ENGINES — PAGÉ — VOL. I
MODERN AVIATION ENGINES — PAGÉ — VOL. II

2000 (6x9) *Pages;* 1000 *Specially Made Illustrations;* 50 *Charts and Tables.*

Just Off the Press

MODERN AVIATION ENGINES

Their Design, Construction, Installation, Repair

By MAJOR VICTOR W. PAGÉ, Air Corps Reserve U. S. A., Author of "Modern Aircraft", "A B C of Aviation", "Everybody's Aviation Guide", etc.

More than 2000 large (6x9) pages, fully illustrated with 1000 engravings and diagrams, including 50 special charts and tables.

Now you can have from one of America's leading aviation authorities the two most comprehensive and the two most important aviation books ever published.

The author spent five years in gathering the data and in the preparation of these two volumes. They bring you practical, up-to-the-minute, authoritative information on the original design, the construction, the installation, the operation, the inspection, the repair and use of all types of aircraft engines.

EXPLAINS AND ILLUSTRATES EVERY TYPE OF AIRCRAFT MOTOR

These two wonderfully illustrated volumes contain forty-six chapters describing the leading aircraft engines of all nations. Special chapters give detailed descriptions of leading commercial engines such as the Wright "Whirlwind" and "Cyclone"; the Pratt and Whitney "Wasp" and "Hornet," Anzani, Cirrus Mark II and III; Packard, Curtiss and Caminez air and water-cooled types and their accessories.

The servicing, overhauling and repairing of these engines and all others are given in minute, careful detail. ***These two great new volumes will bring anyone a better and more thorough understanding of all types of aviation motors.*** They will show you why certain designs and types are favored, why airplane engines work as they do, how they are designed, constructed, installed, serviced, repaired and operated in flight. All accessory systems such as lubrication, carburetion, cooling and ignition, are described at length and complete illustrated instructions for repairing magnetos and carburetors are included.

Prepared with Army and Navy Cooperation and Leading Airplane Engineers

MODERN AVIATION ENGINES, by Major Victor W. Pagé, was prepared with the cooperation of the Army and Navy authorities and leading commercial airplane and engine constructors. This 2-voluma set will bring naw and valuable information to the most advanced professional; it is being rapidly adapted for study by all leading aviation schools, and beginners are using it to save many hours of ground work later on.

SUPPLY LIMITED—ORDER AT ONCE

The coupon gives you an opportunity to examine this set for seven days. If dissatisfied in any way return the books and we will cheerfully refund your money. If you are not in a position to take both books at the same time, you may order only one volume and purchase the other later.

SEND NO MONEY
Just Clip and Mail the Coupon

We have bound a limited number of sets of these valuable books to sell at $9 per set of two volumes—or $5 per volume if ordered singly. YOU MUST ACT QUICKLY. Clip and mail the convenient coupon today—NOW. Norman A. Henley Publishing Co., 2 West 45th Street, New York, N. Y.

Tear Off Along This Line and Mail At Once

NORMAN A. HENLEY PUB. CO.,
2 West 45th St., New York, N. Y.

GENTLEMEN:—Please send hooks checked below with the understanding that I have the privilege of examining the shipment for seven days. I will give the postman the purchase price and postage as a deposit. If not satisfied, I will return the books, and you will refund my money.

Check Choice

☐ Volumes I and II of **MODERN AVIATION ENGINES**, by Major Victor W. Pagé, 2000 pages, 1000 illustrations, at yonr special reduced price of $9.00 for the set.

☐ Volume I only, at the introductory price of $5.00.

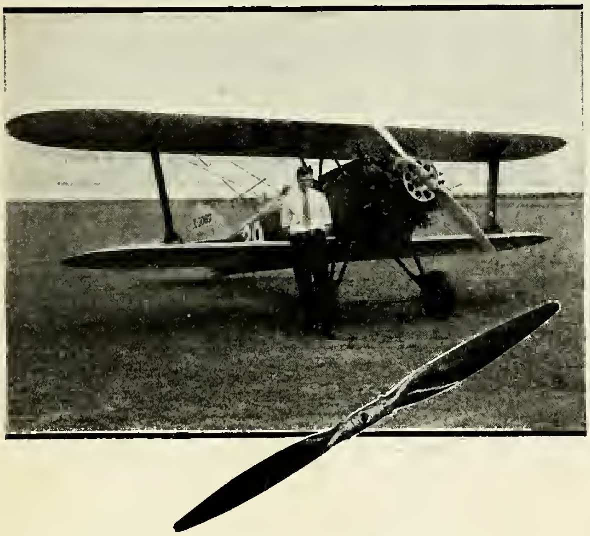
☐ Volume II only, at tha introductory price of $5.00.

Send to ....

Address ....

NOTE—If you enclose remittance with this coupon, we will pay postage charges and allow you the same generous seven day return privilege. (No C. O. D. shipments to Foreign countries or Canada.)

A.D. 8-29



In *the Gardner Annual Trophy Race* .. **Hamilton Propelled Plane** *took* .. **First, Third** *and* **Fourth Places**

AGAIN Hamilton has added another record to its already long list of propeller achievements. In the recent Gardner Annual Trophy Race . . . three out of the first four planes were Hamilton equipped. "Speed" Holman in his Laird took first . . . Arthur Davis in a Waco, third . . . and John Wood in a Waco, fourth.

Pilots everywhere have found that Hamilton Propellers assure them of the finest performance. The "prop" is fitted to the plane . . . There is precision balance . . . superb workmanship . . . and maximum efficiency.

Hamilton Propellers are made from either wood or metal . . . with or without spinner. A size and style to fit every type of plane. And incidentally, have you ever thought of having a spare propeller handy? It is rapidly becoming accepted practice of seasoned air men.

Write for full information and prices.

Hamilton Aero Mfg. Co.
1400 Bremen St. MILWAUKEE, WIS.

GLIDERS AT THE NATIONAL AIR RACES

(*Continued from page* 71)

guards. Arrangements also are being made to have tools and repair equipment readily accessible.

The competitive events will comprise the major part of a two-day glider program. Plans also include a breakfast and conference and the showing of motion pictures of engineless flight in this country and abroad. The program will be given under the auspices of the National Glider Association, the Cleveland Glider Club and the Cleveland National Air Race and Show Corporation.

A feature of the glider flying will be a series of special demonstrations and "stunts" voluntarily announced by representatives of the glider club to prove the maneuverability and possibilities of primary engineless aircraft.

Frank M. Blunk, of Orion, flying for the Pioneer Glider Club, will stand on the wing of a glider while Oscar Kuhn, German-trained pilot, flies the craft. They will also fly separate gliders, moving across each other's path.

The events will open with the breakfast and conference in Hotel Winton at 8:30 o'clock Tuesday morning, August 27, following the registration of delegates at a desk on the mezzanine floor of the hotel, in which glider headquarters will be established. The conference, as the second national meeting of its kind, will consist of brief addresses and reports from individual clubs affiliated with the National Glider Association. The speakers are expected to include E. S. Evans, of Detroit, founder and president of the national association; Anthony H. G. Fokker, designer of the first two-seater glider in Germany; Miss Earhart and Dr. Wolfgang F. Klemperer, of Akron, holder of the first glider pilot's license awarded in Germany.

The party will then go to the airport for the first four contests. Suitable prizes will be awarded the first and second place winners of all these events.

Clubs from Detroit, Cincinnati, Pittsburgh, Jackson, Michigan, Ann Arbor, Michigan, Orion, Mich., Akron, Toledo and Cleveland, are expected to be represented with entries.

On the evening of Tuesday, August 27, the motion pictures will be shown in a wing of Public Hall, the scene of the aeronautical exposition, and a review of glider progress in the United States will be given by Donald F. Walker, manager of the National Glider Association.

On the following morning, the remaining four contests will be staged.

The eight events are as follows: (1) Distance, shock-cord launching method; (2) duration, shock-cord launching method: (3) distance, auto-towing method; (4) duration, auto-towing launching method; (5) landing on a mark, auto-towing launching method; (6) famous motored pilots' derby, auto-towing launching method, duration and landing on a mark each to count fifty per cent; (7) best all-around handling of a glider, for glider pilots only, and (8) best all-around handling of a glider for any pilot.

Rules for Events 1 *and* 2. Distance: from point of departure to point where glider first touches the ground. Duration: from moment glider starts until moment it touches the ground.

Rules for Events 3 *and* 4. Distance: From center of line followed by auto in launching to point where glider touches the ground. Duration: from moment launching rope or wire is released until moment glider touches the ground.

Rule for Event 5. Point glider touches the ground to count.

(*Continued on next page*)

No. 50—Chocolate Brown Helmet, Glove Leather, Chamois Lined, with ear pads $6.00
No. 556—Same as above except white or khaki canvas $2.00

When ordering direct he sure to send money order with head size. Same will be sent P.P. Prepaid. Mondl Helmets are patented in U. S., England and Canada.

Famous Flyers Use MONDL HELMETS

During those flights that test the stamina of flyer and plane alike, those grueling tests of endurance against the elements, where every precaution must be taken, you will find aviators using Mondl Helmets. With a wide chin strap, hugging the cheeks; designed to fit the head closely; Mondl Helmets are windproof. They are made of fine quality glove leather, chamois lined and equipped with ear pads to deaden the unceasing roar of the motor.

Mondl Helmets are comfortable and meet the exact needs of the flyer.

FOR RETAILERS' ATTENTION

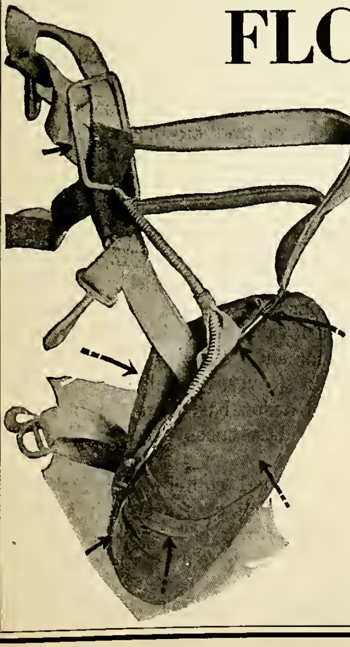
Mondl Helmets have proven themselves good sellers. Write for a sample helmet and our attractive proposition.

Mondl Manufacturing Co.

Oshkosh, Wisconsin, U. S. A.

The Official Navy Tests at Lakehurst Proved

FLOYD SMITH SAFETY PACK



Far superior to all other makes of parachutes used.

Out of nine test drops made by navy officials from balloons and J ships from 600 feet to 1,000 feet, the Floyd Smith Safety Chute averaged 4/5 of a second quicker opening per drop with a total gain of 7 3/5 seconds.

The reason is no flaps, no elastic bands, no fragile wire—just one solid pack with one sure cable release—study the arrows on pack and write for Booklet "Coming Down," for full information.

Splendid territory open to live distributors. Let us tell you our sale and merchandising plan.

SWITLIK MANUFACTURING CO.

Factory: Trenton, N. J.
Sales Office: 302 City Centre Bldg., Philadelphia, Pa.

(*Continued from preceding page*)

Rule for Event 6. Above rules to apply. Ties to be run off.

Events 7 and 8 are to be judged by: Dr. Wolfgang, F. Klemperer, Franz Gross, designer of the Darmstadt, Prof. Peter Altman, University of Detroit, and Prof. R. E. Franklin, University of Michigan.

Rules of the National Glider Association and the National Aeronautic Association will apply on all points other than the above. The contests will be subject to the direct supervision of the national contest committee of the National Glider Association, Ray Cooper, Detroit, chairman.

THE WHEREFORE OF WAR (Part II)

(*Continued from page* 74)

and vary with each country discussed, and no amount of Brotherhood talk seems to dispel them.

In themselves they are only passive contributing fuel to the flame of war, but in their potentialities they are soil in which the most violent seeds of hate and blood lust can be sown and reaped.

We are at peace with France. To us Paris is a place where we can make whoopee at less than the New York quotation. We don't understand French—but it sounds better than Italian possibly—softer. The Frenchmen are all right, although a little too polite. If the waiter overcharges us, remember Lafayette and the war debt. Perhaps the waiter needs the money.

But give us war with France. Now then—watch. Rotten immoral place, anyway—Paris. Damn Frenchmen doused in perfume. Why didn't they pay up like men? Well—what about Lafayette? We'd have won anyway. Highway robbers—all of them.

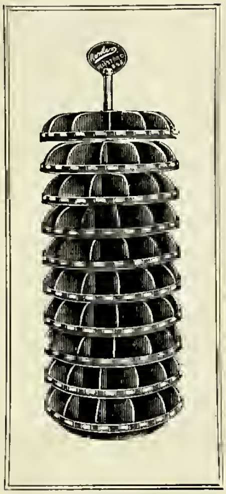
And if you don't believe it, think back prior to 1914 and see the German-American of that period. Honest, hard working, jolly, funny, friendly and the best of fellows with his beer and his music and his wienerwurst and his pathos and sympathy. Jump to 1917 and see the sudden transformation into Hun, fiend, murderer, baby killer, sneak, bully and general all-around bad man. The answer? Propaganda growing in the soil of politically different environments—and that is absolutely all, there isn't any more.

What the answer is I don't know. Increased travel, faster communication, greater understanding, mass education, resulting finally in one great international nation, may solve this problem of difference and remove it as a contributing cause of war. And yet I don't know. Go back to those forty thousand Americans, of last month's article, who entered the British Army prior to 1917. Many of them I presume had gone to school in England—Many lived there since. Perforce they must have many firm English friends. They lived and died with Englishmen. They have English social affiliations, but give us war with England and the call of first loyalty, tradition and tribe is strong upon them in a moment. "Damn Limeys," they say, "handkerchiefs up their sleeves," and back they come to the fold with a renewed ardor based on the fact that they know at first hand the differences between Englishmen and Americans.

Difference, then, is our second contributing factor to war. Minor it may be, in which case accept it as such but by no means disregard it, for it is by playing on this difference that the propagandist, who today with the heaviest

(*Continued on next page*)

A Bit of News
TO THE
Aircraft Industry



No. RS-77

Revolvo Equipment

WILL SAVE AT LEAST
50% SPACE

Usually required for stock of parts, accessories and supplies in factory, airport, hangar, repair-shop or stock room.

"REVOLVO" is the equipment that will afford proper arrangement of stock in most convenient, accessible and compact space possible.

The airplane industry requires modern equipment and the solution is

Revolvo

INVESTIGATE
THE WELLSTON MFG. CO.
WELLSTON, OHIO

45,360 GALLONS IN 24 HOURS!

SO efficient is the drainage capacity of a single length of "Poroswall" Rapid Drain Pipe that it will allow 45,360 gallons of water to pass through its walls in twenty-four hours, the equivalent of the contents of an enormous water tank.

THERE is no other drain pipe obtainable which can even approach this remarkable record of efficiency. This is because there is no other drain pipe similarly constructed.

The entire wall area of "Poroswall" is porous as its name implies so that drainage water may seep into the pipe at any and every point.

Furthermore, "Poroswall" permanently retains its initial high drainage capacity because it has no open joints where foreign matter may enter to clog the interior of the pipe. "Poroswall" is laid with tight joints, convex ends fitting snugly and instantly into concave ends.

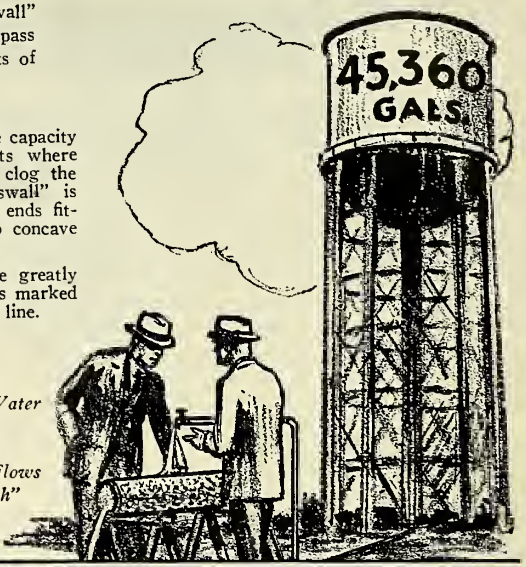
In addition, the latter feature greatly reduces laying cost and insures marked economy in the finished drain line.

Walker Cement Products, Inc., Little Ferry, N. J.

"A Foot of Drainage for Every Foot of Pipe"

WALKER POROSWALL RAPID DRAIN PIPE

"The Water Seeps In and Then Flows Through"



Boeing's high endorsement of HASKELITE

One of the HASKELITE equipped tri-motored Boeing planes in flight

PLYWOOD
HASKELITE
PLYMETL

THE extensive use of HASKELITE in the new 18-passenger Boeing planes for the mail route between Chicago and San Francisco is high endorsement of the remarkable qualities of this blood albumen glued plywood. Besides attaining a speed of 135 miles an hour and carrying 8½ tons in weight, the new Boeing planes must stand up in all extremes of temperature, weather and altitude met on the Golden Gate-Lake Michigan Route.

Five million miles of flying by the Boeing System has demonstrated the great dependability and uniformity of the light weight, strong HASKELITE. It was used for the wing ribs, spars, nose cover, beams, and similar parts on the new Boeings. Write for complete information and useful engineering tables. Sent free to engineers and manufacturers on request.

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Universal Schools provide safe, thorough instruction to qualify student for examination for private, limited commercial or transport pilot's license.

Learn the Way
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GET a true picture of this rapidly developing industry. See the opportunities it offers young men. Clip the coupon and mail for your free copy of the book "Aviation—What It Means To You." Read in this book the thoroughness with which students in Universal Aviation Schools are trained as Aviation Mechanics and Pilots. See why flying training will place you at a big advantage although you may engage in one of the many other lines of aeronautical work. Familiarize yourself with the various aeronautical terms as explained here. This book is interestingly written, truthful in all respects, full of illustrations and honestly helpful to you in planning a way to enter this field of big, new opportunities. Send for your copy—FREE—today.

Graduates of the Universal Aviation Welding Course are always in demand

Ray Kutterer, a Universal student who now holds a responsible position with the Universal Aviation Corporation.

Background of Universal Aviation Schools

Universal Aviation Schools form a national system, individual schools being located in a number of key cities and all schools offering the same courses and high type of training. These schools are owned and directed by the Universal Aviation Corporation, a concern which, with its affiliated lines, covers over 17.500 miles of airways a day carrying air mail, express and passengers. Having the tremendous resources of the Universal Aviation Corporation behind them, the schools have been provided with the finest equipment obtainable and the most competent instructors in the country.

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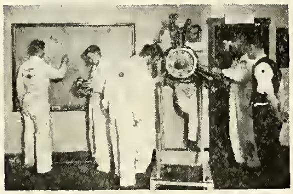
Only new production, government licensed planes and thoroughly experienced government licensed transport pilots are employed in Universal flying training. The remarkable safety of Universal training is shown by the fact that Universal flight students were the first to he offered complete insurance protection throughout their training by an established insurance firm. This insurance assists you in securing financial backing to learn to fly. Full details are explained in the book "Aviation—What It Means To You." Mail coupon for your copy.



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(Continued from preceding page)

artillery has God on his side in the event of war, recruits huge armies from the civilian population and sends them out with the Crusader's ardour to conquer or die.

Goodwill may come and goodwill may go. Treaties may be signed and Leagues formed, but at the first note of the bugle and the first scratch of the propagandist's pen, the world divides itself into ardent school teams called "Money Grubbing Yanks," "Frogs," "Wops," "Lime juicers," "Yellow Monkeys," "Huns," "Greasers," and "Chinks." They are the same teams that exit side by side quite harmlessly in peace-time, laughing the difference off, joking about each other—but give them war and inflamed hatred wipes off the smile. This hatred may be artificially stimulated and it may be false altogether—but whether it is or not, it serves the purpose just as well as the genuine article.

Granting that there is a genuine article upon the foundation of which such a false structure as our anti-German hatred of 1917-18, propaganda-born and bred, can be erected—that article must be man's inherent patriotism.

Let us examine it and find in it a contributing cause for war if we can.

(To be continued)

DEFINING THE RANGE OF RADIO STATIONS

(Continued from page 69)

quency detector is the same as the voltage across half the loop due to the signal. This voltage is equal to the voltage across the entire non-inductive input shunt, as measured by the step-down ratio of the shunt, and by dividing this voltage by half the step-up ratio of the loop, we obtain the voltage induced by the signal.

"A field strength measurement may be obtained as follows: First, the signal is tuned in on the receiving set so as to give a suitable reading on the detector meter; next, the local signal oscillator is started and by zero beating tuned to the same frequency as that of the signal. Care should be taken here to make sure that the local signal oscillator is not zero beating with some stray signal or with the beating oscillator, and it is found convenient in this connection to watch the detector meter while adjusting the frequency of the local oscillator. When the beat note between the oscillator and the signal becomes very low; that is, below audibility, the needle on the meter will start moving up and down the scale as the two frequencies pull in and out of phase, thus indicating that the oscillator is being adjusted to the right frequency."

The field intensity range of this portable equipment is about 30,000 to 20 microvolts per meter, but this range may be extended to 200,000 microvolts per meter by increasing the resistance unit in the output side of the potentiometer to a corresponding degree. The wave length range, too, may be broadened at both the higher and lower bands by the use of interchangeable oscillator coils.

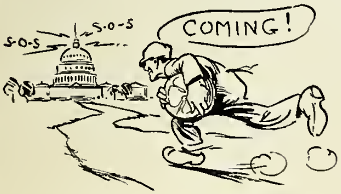
The importance of measuring the field strength of radio stations—in the air, on land and sea—is suggested by the fact that all of the nine radio supervisors of the Department of Commerce have been provided with portable field-intensity measuring outfits. Not only are they used in determining the reliable service range of broadcasting stations and airplane transmitters, but for indicating the effect of relatively high power in both creating interference and in overriding static and other disturbances. These portable field sets enable radio inspectors to measure the strength of transmitting stations and thus regulate the power of stations so that they will not produce excessive interference.

Uncle Sam Knows His Onions

By E. B. GALLAHER
Treasurer, Clover Mfg. Co.
Editor, Clover Business Service

You know there's an old saying, "Straws show which way the wind blows." Here's a story about three straws:

In a recent ad I called attention to the new Government specifications for grinding and lapping compounds. Everybody was getting tired reading bunk advertising about "speed" and other questionable claims made by some manufacturers of grinding compounds, so the Government took a hand—made exhaustive tests of all compounds—found that a **grease-mixed** compound cuts $3\frac{7}{10}$ times faster than any other—found the **grease** binder superior to all others—then issued standard Government specifications, whereby **all** compounds in future are to be bought on their **work value**—stated that grease-mixed compounds only would be bought—water-mixed compounds no longer acceptable.



In my mail this morning I find two Government proposals, sent from different departments, dated February 27th and 28th, 1929—thought you might be interested in their wording. Here they are:

"Please quote this office by letter . . . 50 lbs. compound; valve-grinding; medium; grade C; **only as manufactured by Clover Mfg. Co., Norwalk, Conn.**"

"Sealed bids requested . . . grinding compound; **Clover brand** or equivalent . . . in 4 oz. duplex cans."

It takes a pretty wise guy to fool the Government on quality—it has the reputation of **knowing** values and **buying** them—it doesn't buy bunk. ***Here are two of our straws.***

A third straw—**Commander Byrd's Antarctic Expedition** carries with it **only** Clover Grease-Mixed Grinding Compound for the care and upkeep of their airplanes and other machinery. Surely these experts know what they are about! They certainly can't afford to take a chance and—may I suggest?—neither can you.

E. B. Gallaher

If you haven't used the latest development in High-Speed Grease-Mixed Grinding and Lapping Compounds, better get next—send for free sample.

CLOVER MFG. CO., NORWALK, CONN., U. S. A.
SINCE 1903

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AUTOMOBILE NICKEL PASTE
METAL POLISHES
CLOVER GRINDING AND LAPPING COMPOUNDS

E. B. GALLAHER:
Clover Mfg. Co., Norwalk, Conn.
You may send me, without obligation:

- ☐ Sample Clover Grease-Mixed Grinding Compound—the kind the Government is buying.
- ☐ Clover Water-Mixed Valve-Grinding Compound. In its class, there's nothing better.
- ☐ Green-Stripe Sandpaper.
- ☐ Red-Stripe Turkish Emery Cloth—for polishing.
- ☐ Yellow-Stripe Aluminous Oxide Cloth—for cutting hard metals. The universal shop abrasive.

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Character of business

Myriads of dust particles beating against the plane

WHILE mechanics are testing and adjusting airplane motors, or planes are taxiing across the landing field, whirling propellers whizz myriads of oil-covered dust particles against the plane's surface. This grating bombardment of the wing and fuselage covering must be resisted.

Titanine-covered, the surface is safeguarded. For it repulses the dust particles that would otherwise grind their way through cracks and break down the fabric texture.

Titanine-protected surfaces do not chip or crack because Titanine pigmented dopes and lacquers are practically free from any tendency to brittleness. Their flexibility and high covering power assure a strong surface that lengthens the life of the fabric it protects from the injurious effects of sun, wind, rain, snow, sleet, dust and dirt.

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Gentlemen—Please send complete booklet information on Titanine airplane finishes.

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SELLING AIRPLANES ON THE INSTALLMENT PLAN

(*Continued from page 78*)

For the established business man who would like to enter aviation, but who hesitates to take from his working capital the full price of a ship, the finance plan again is useful. He can organize a flying school, sell courses, establish a ground school, hire a pilot, conduct a general aerial taxi business, engage in sales work and learn to fly himself with an initial investment of approximately $1,600. This is figured on the basis of a $4,000 ship. For the next ten months he pays $132 on the 1st and 15th as installment payments. If he is a good business man and is aggressive in his operations, he ought to be able to make payments directly from the business without additional working capital. In addition there is a good possibility that he may be able to obtain a dealer franchise and thus open for himself another source of income.

Those who formulated this plan gave special consideration to the financing of used ships. Distributors and dealers who have such planes may accept 50 per cent down payment. The unpaid balance may be paid in the same manner as for new ships and at the same finance charge.

The finance plan applying to second-hand ships differs from that for new ships in that the distributor endorses the note. He may apply the down payment on a new ship.

Flying schools are thus able to reduce working capital by selling new or used ships to groups of students taking training. This also reduces instruction costs for the students. Bennett Airways, Inc., Eaglerock distributor for western Missouri and Kansas, has evolved such a plan. Students may take their instruction until solo with an instructor, but in their own ship paying only for the instructor's time. After solo, they fly under supervision of the school at a still lower price until completely checked out for the required number of hours for respective licenses. The school has complete control of the ship so purchased, including care of the engine, rigging, decision as to times when students may or may not fly; in fact, everything regarding the ship just as if it belonged to the school. For the safety of students, these provisions must be included in the contract.

Perhaps the greatest effect this finance plan will have on the aviation industry is that it will ultimately place airplanes within the reach of the average American family. The progress of airplanes and automobiles has often been compared. It is well known in the case of the automobile that greater comfort, increased production with resultant lower cost, and family ownership have grown simultaneously with installment buying. The time is probably not far distant when airplane finance will increase production sufficiently to lower manufacturing costs and thereby open another market for planes. Today 75 per cent or more automobiles are sold on the installment plan. In fact cash purchases are so rare that the average automobile salesman is in danger of heart failure when one occurs. It just isn't done. Most automobile owners buy their cars and pay for them out of their earnings.

One can look ahead in the airplane industry and see the same thing happening there. Probably one may not expect substantial immediate reductions in airplane and engine prices. Production must come first through additional users, then lower price and more customers in the never ending circle.

The Chapman Air-liner, with landing gear retracted, in flight. Designed and built by V. J. Burnelli.

Metal Aircraft of Patented and Proprietary Designs for Special Requirements by

V. J. BURNELLI

An intimate association with the aviation industry for more than fifteen years, in the capacity of designing engineer and builder, has equipped Mr. Burnelli with the knowledge and experience so essential in the design and construction of aircraft for special requirements.

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YANKEE SIEMENS ENGINES

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When you have been satisfied on safety, reliability, and certainty of operation of an airplane engine, you next look for *low operating cost*. You will find that these engines, with an international reputation, exactly fit your need.

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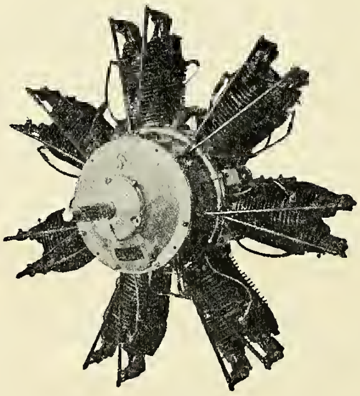
THE TWELVE 500 H.P. JUPITER ENGINES POWERING THE GIANT DORNIER D. O. X. ARE SIEMENS BUILT.



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It's the men on the ground who keep the pilot **in the air!**

For every job in the air there are scores on the ground . . . . in the drafting and engineering rooms; service and operations branches; in the engine shops; rigging and construction departments; in the pilot's and navigator's seat, equipped as they are with radio and direction finding instruments . . . . and so on down the line. All of these positions pay attractive salaries; but none of them is open to men who are not trained to fill them.

The *Institution of Aeronautics* specializes in Aeronautical Engineering, Drafting, Airplane Construction, Rigging, Engine Mechanics, as well as preparation for all of the Pilot's Licenses. All phases covering the theoretical and the manual training involved in airplane operation, as taught at our Institution, will qualify you for these responsible positions.

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Gentlemen: Please send me complete details of your courses.

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CIVIL AERONAUTICS IN JAPAN

(*Continued from page 79*)

the calendar years for which figures are given.

Japan at present has 17 airports available for civil areonautic use—7 land airports, 7 marine, 1 international in Japan proper and 2 in Chosen. Another is projected for Naruo, near Kobe. The only international civil airport is that at Kizugawa, within the city limits of Osaka, opened to traffic on April 1, 1929, when the semi-official Japan Air Transport Company commenced its services. This field has an area of approximately 3,600,000 square feet on the shore line of Osaka Harbor.

Open-water or military aviation fields in the neighborhood of large cities have hitherto been used, with few exceptions, by commercial air services and international fliers. The military authorities have been accommodating in this respect when landings have not involved unauthorized flying over fortified zones.

Temporary land and marine airports for the use of the Japan Air Transport Company will be completed by the government during the present year at Fukuoka, Tokyo, and Tsushima. Permanent facilities, including direction-finding apparatus, are asked for in the budget presented to the Diet.

The government general of Chosen has in hand the construction of international airports at Urusan and Joita, and the government at Dairen is preparing an aviation field near that city. All Government airports are to be fitted with wireless and meteorological equipment, but no provision has been made as yet for the construction of lighted airways. The Chosenese government has established eight aviation landmarks to guide fliers from the Manchurian border.

There are also several private airports in Japan, most of them consisting of a small level field and a hangar or a shed on the beach for the housing of seaplanes. These private fields usually are ground leased by commercial operators, newspapers, aeronautic schools, or research workers.

The domestic manufacturing of aircraft and aeronautic equipment within Japan has been fostered by the military and naval authorities to such an extent that the 13 manufacturers are able to meet all ordinary requirements, though their products are said to be somewhat in arrears of developments in Europe and the United States.

It is probable, therefore, that airplanes embodying the latest features will be imported in limited numbers, principally for use in commercial air services and as guides for Japanese manufacturers. Aircraft engines will be purchased abroad in greater numbers, even by the Japanese armed forces, as will also materials for airplane construction and aeronautical instruments. These are precision products, which can probably be made more economically abroad than in Japan.

Practically all Japanese airplanes are copies or modified imitations of foreign machines, and the leading manufacturers of airplanes and engines hold licenses from European manufacturers for the production of the types of units they make. Some preference for the imported engines is shown, even by the army and navy. The industry owes its existence to the military requirements of the empire and to the desire of the authorities to make the country self-supporting in the event of an emergency. In view of the present stage of development of the Japanese aeronautics industry, it is not anticipated that competition from Japanese manufacturers will be felt in the

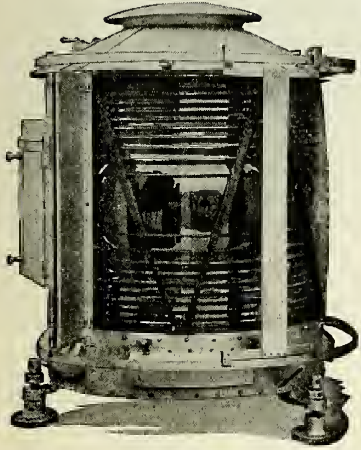
(*Continued on next page*)

"THE MIDNIGHT SUN"

Every Night — during the National Air Races the Cleveland Airport will be illuminated by a powerful B.B.T. Air Mail Landing Floodlight, its high intensity light source turning Night-time into Day.

Every Night — for the past four years this same Floodlight has been providing the Maximum degree of Safety to all Pilots using the Cleveland Airport after dark.

Every Night — for many years to come, this same floodlight will continue to render the same uninterrupted reliable service, because its sturdy construction (which is true of every B.B.T. product) renders it practically wear-proof.


TYPE M-8-D

Nearly every Major Airport in this country and abroad is "Floodlighted by B.B.T.," some recent installations being Newark, Buffalo, St. Paul, Wichita, Denver, New Orleans, Lincoln and ports of call used by the Transcontinental Air Transport, Inc.

Before deciding on the Floodlight equipment for Your Airport, investigate this almost unanimous preference for and the superior illumination qualities of

"Aviation's Bad Weather Floodlights"

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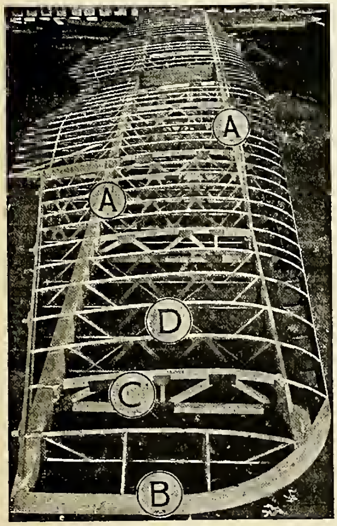
Our latest Catalog "Safe Airport Lighting" just off the press is yours for the asking.

SITKA SPRUCE



Airplane Wing Construction of Sitka Spruce. A—Wing Spar; B—Wing Bow; C—Compression Strut; D—Web Rib.

Sitka Spruce, scientifically cured and of Aircraft quality. Our technical knowledge of aircraft requirements and practical experience in airplane construction enables us to fill your needs intelligently.

PLYWOOD

All thicknesses — 1/32", 1/25", 1/24", 3/64", 1/16", ⅛", 3/16", ¼", ⅜".

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LARGEST ASSORTMENT OF AIRCRAFT WOODS IN THE WORLD
244 WILLIAMSON AVE., YOUNGSTOWN, O.

AIRCRAFT WELDERS *are the* HIGHEST PAID MEN *in the Shop*

20 hours of lectures and class room work embracing Aircraft Construction, Government Requirements, Theory of Welding, etc.

WELDING is playing an increasingly important part in the construction of planes. Approximately 90% of the airplane manufacturers today have adopted welded steel construction. With the trend in design and construction of planes towards the all-metal type and the all-steel cantilever wing, the demand for experienced aircraft welders is constantly increasing.

In a few months, without any previous experience, under the personal supervision of our skilled, practical instructors, you can learn a trade that is in big demand, a trade that will enable you to break into aviation and earn fine wages while preparing yourself for an executive position.

Thousands of experienced welders will be needed if the estimated number of planes are to be built in 1930. Factory employees must understand oxy-acetylene welding to be in line for promotion to Department Heads, Factory Superintendents, Production Managers.

Get in on the ground floor and grow with the fastest growing industry in the world. The coupon below will bring you information that will convince you of the *golden* opportunities awaiting men who know aircraft welding. You should mail it *now.*

160 hours of actual shop work including the repair and building of planes.

The NATIONAL AIRCRAFT WELDING SCHOOL

The National Aircraft Welding School
324 West 6th Street Trafficway, Kansas City, Mo., Dept A

Send me, without obligation, information concerning your School, the possibilities open to your graduates and your Placement Service.

Name..

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(Continued from preceding page)

aircraft markets of other parts of the world.

The rapid progress made abroad in civil flying after the war, the adherence of Japan to international conventions relative to air navigation, and the meager advances in Japanese civil aeronautics while under the jurisdiction of the War Office led to the transfer of the control of civil flying to the Department of Communications in the early months of 1923, where an aeronautics bureau was organized for the regulation and promotion of Japanese civil aeronautics.

Since 1923 the assistance of the government has been noticeable in Japanese civil aeronautics, though aid from this source was not very substantial until last year. In the fiscal year 1923-24 official encouragement consisted chiefly in the sale to civilians of obsolete military airplanes at nominal prices. These sales, continued at irregular intervals, have enabled Japanese newspapers, aeronautic schools, and research workers to obtain most of the machines with which the flying under their auspices has been conducted.

Two years later the bureau received an appropriation of 90,000 yen ($36,000) for distribution among civilian fliers as a subsidy to maintain and replace airplanes and to compensate for damages received by aviators and machines. Increased appropriations have been received during each subsequent year, reaching 356,000 yen ($164,472) during the fiscal year 1928-29.

The aeronautics bureau also furnishes annually to a small number of selected youths an 8-month training course at an army or navy aeronautics school.

In 1927 the sum of 493,000 yen ($234,175) was made available to the Imperial Aero Association of Japan for initial preparations leading to the operation of air services from Tokyo to Shanghai and to Dairen.

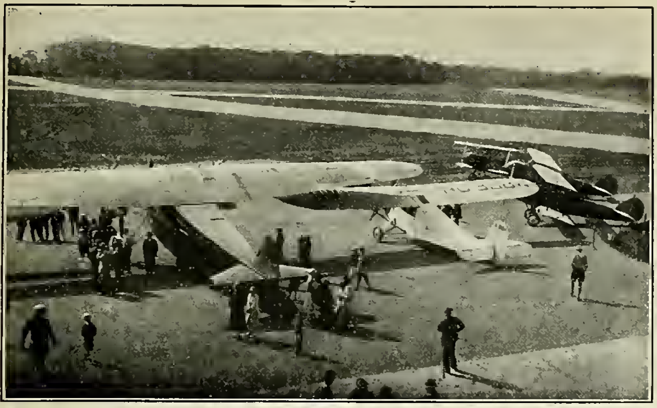
Part of the government appropriations received since 1925 for civil aeronautics have been expended in subsidizing the four commercial mail services mentioned previously. Subsidies were increased during 1928 to an average rate of approximately 30 sen (14 cents) per kilometer and flights became more regular and frequent. It was also during 1928 that the government gave full expression to its delayed decision to place Japanese civil aeronautics on a basis which would enable Japanese airlines to meet future competition on the airways radiating from the country by authorizing the formation of the semi-official Japan Air Transport Company, with the promise of a subsidy totaling 19,970,000 yen ($9,226,140) over a period of 11 years. The government also guaranteed the stockholders a minimum dividend of 8 per cent per annum.

The aeronautics bureau has introduced into the 1929-30 budget an item calling for the expenditure of 3,845,292 yen ($1,768,834) to be spent over the years 1929, 1930, and 1931 on the construction of civil airports at Tokyo, Fukuoka, and Tsushima, along the new international airway between Tokyo and Seoul in Chosen (Korea).

Expansion of civil flying in Japan is centered in the Japan Air Transport Company, and the description of that company's plans is equivalent to an outline of the major developments to be expected in the civil aeronautics of the country.

This concern, named in Japanese the Nippon Koku Yuso Kabushiki Kaisha, was incorporated in Tokyo on October 20, 1928, under the auspices of the Japanese government,

(Continued on next page)



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THE D. W. Flying Service, Inc., takes pleasure in announcing that its flying school is one of the very few in the country which has successfully met the rigid requirements of the U. S. Dept. of Commerce for student instruction and received a certificate of approval. Coupled with the fact that the D. W. Flying Service School operates exclusively from the Donald Woodward Airport, the finest private air port in the United States, this government approval should make it a most desirable one for you to attend to get your flight and ground instruction. Private Pilot and Limited Commercial courses. Write for information.

REGISTRATION IS LIMITED

Although there is no urge to act hastily or without due consideration, we beg to call your attention to the fact that registration in the D. W. Flying Service School is limited to the number of students which we can handle thoroughly and safely. We have at present room to accommodate about thirty more. When these thirty places have been filled there will be no more applications accepted for approximately three months. If you are anxious to start your course at once, it will be well to write us immediately.

There are excellent accommodations for board and room in Le Roy and, in accordance with our policy of graduating only students who are thoroughly trained, we are desirous of accepting only those who can spend their entire time at the school. Approximately six weeks are required for the Private Pilot's course and about three months for the Limited Commercial course.

DW FLYING SERVICE INC.

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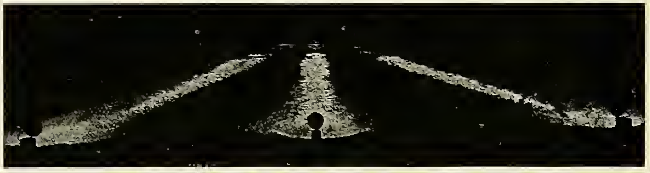
PORTALITE Projects Beam of 300,000 C.P. ONE MILE!

Each detachable battery operates searchlight 2½ to 3½ hours on each charging. Weight complete, 13½ lbs.



BEAM TYPE PORTALITE FOR NIGHT LANDING (Photo 1)

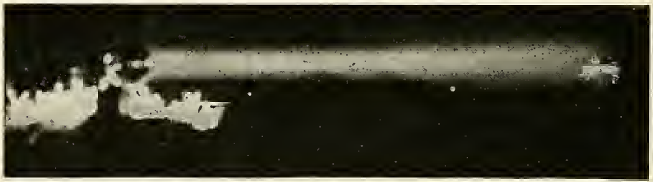
The apex of the light triangle formed of beams from the PORTALITE is approximately 2,000 ft. away. Irregularities on the landing field are spotted by the 300,000 c.p. beams. Pilots can accurately determine just how the ground lies in coming in between these strips. The PORTALITE is for use on fields not equipped with landing lights, or on large fields in case the lighting system fails.

AIRPORT LIGHTING

The Beam type Portalite provides an effective yet inexpensive emergency lighting system for all airports when their regular lighting systems fail. It saves small airports the expense of installing permanent lighting, making it possible for planes to land or take off at night (See photo 1.)

FOR FUELING, MAKING REPAIRS OR ADJUSTMENTS

The Portalite may be supplied in a FLOOD TYPE. It will light 30,000 sq. feet at a distance of only 50 feet. Extra batteries are also a convenience.



(Photo 2)

PORTALITE PROJECTING ITS BEAM ON HOUSE THREE-QUARTERS OF A MILE AWAY

FOR USE ON PLANES

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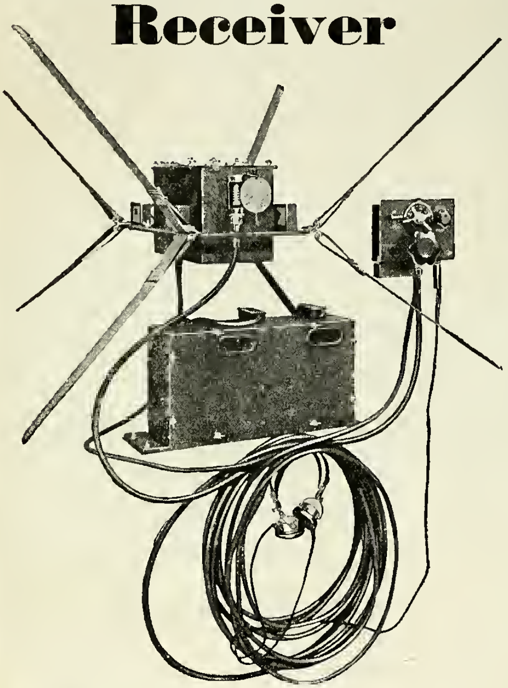

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(*Continued from preceding page*)

with an authorized capitalization of 10,000,000 yen ($4,600,000). Only Japanese subjects are permitted to hold stock in the company. A dividend of 8 per cent per annum is guaranteed by the Japanese government, which is represented on the board of directors by a high official of the Department of Communications.

Active operations of the company commenced on April 1, 1929. Its plans include the inauguration of a twice-daily round-trip service between Osaka and Tokyo (excepting Sundays), six round trips weekly between Osaka and Fukuoka, and three round trips weekly between Seoul and Dairen. Test flights are also to be undertaken during the present year between Fukuoka and Shanghai. Passengers, mails, and parcels are to be carried on all lines.

During 1930 the number of weekly return trips between Fukuoka and Seoul is to be increased to six, and the same number of round voyages is to be made weekly between Seoul and Dairen. The schedule between Fukuoka and Shanghai is to be placed on a regular tri-weekly basis. Eventually the company's services are to be extended to Mukden and North Manchuria (where connections will be made with Trans-Siberian Airways) and to northern points in Japan.

The lines commenced in April of this year supersede two of the four commercial services mentioned heretofore, namely, that operating the Tokyo-Osaka line and that operating the Osaka-Fukuoka line.

It is estimated that 90 per cent of the company's revenue will be obtained from the carriage of mails and 10 per cent from passenger traffic.

The equipment of the Japan Air Transport Company will consist of 29 airplanes and 34 spare engines.

(*Courtesy of Commerce Reports, Dept. of Commerce.*)

YO HO! THE VULGAR BOATMAN.

(*Continued from page 75*)

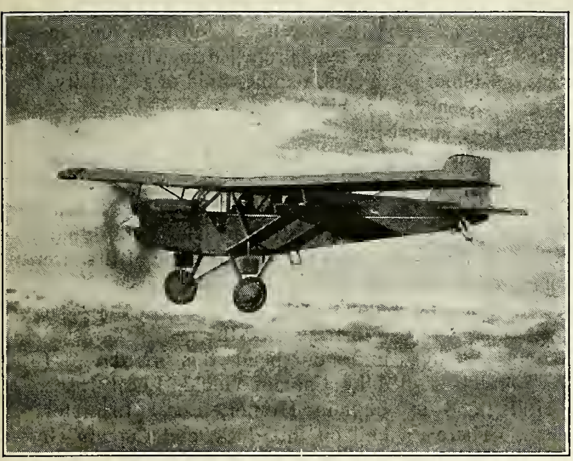
men, not as able as we used to be, drifting onto the lee shore of life with our anchors dragging. One of these days they'll pass the hat for us and shove us into the Old Sailors' Home. It's right near the dock in Cleveland, so they won't have far to carry us or drag us. Or they might simply fill us with concrete and sink us. I really believe that would be the best way. I suggest trying that on our battleships, by the way.

This pathetic trio of Master Mariners is commanded by Commodore or Port Captain Ralph DeVore, superintendent of the Thompson Aeronautical Marine Division. He's pretty far gone, too. I wrote about him in my other department last month, so you know him. Our assistant pilots are Beard, Apitz, and Kasper. This Kasper, a former German citizen whom I neglected to destroy during the war, flies with me and, for his sins, does all the mechanical work needful to keep the Wright Cyclone percolating. We often wonder what we fought in that war for, and who won. The Germans still have their beer and we have our regrets.

You might think, folks, that all we three old tars need in order to shove these Loening ducks from Cleveland to Detroit with their loads of so-called precious human freight is the usual Transport Pilot's License, issued by the Department of Commerce under the kindly guidance of that valuable citizen to the United States and to aviation alike—the Hon. William P. MacCracken, Jr. Not so. In addition, we

(*Continued on next page*)

BE AN EXPERT



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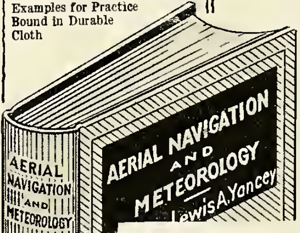
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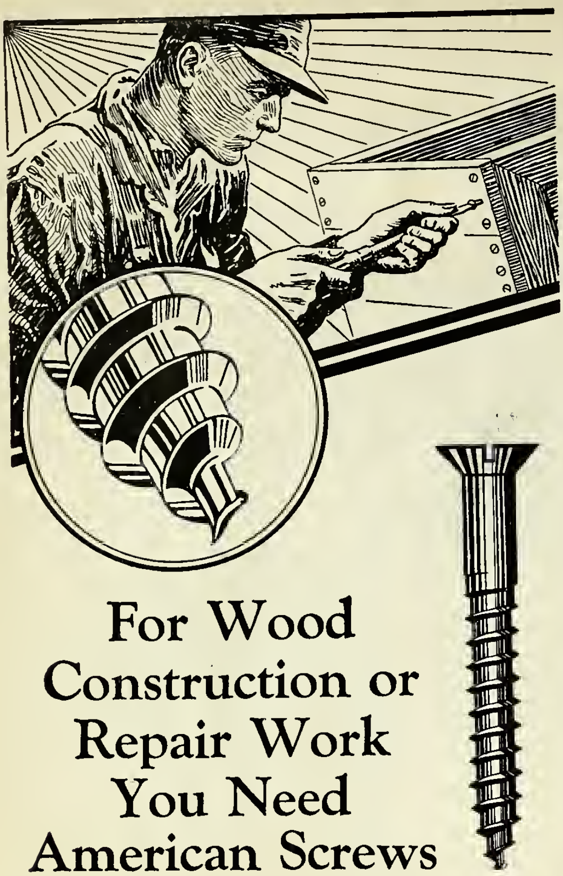

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(*Continued from preceding page*)

must hold a very legal looking parchment which I have before me, to wit, viz: "UNITED STATES DEPARTMENT OF COMMERCE STEAMBOAT INSPECTION SERVICE LICENSE to operate or navigate vessels not more than sixty-five feet in length propelled by machinery, and carrying passengers for hire, and vessels of fifteen gross tons or less, propelled in whole or in part by gas, gasoline, petroleum, naptha, fluid or electricity, and carrying passengers for hire."

After that surprising burst of words it goes on, with even more dignity and verbiage: "Cy Caldwell is hereby licensed under the provisions of Acts of Congress approved June 9, 1910, by the Board of Local Inspectors, Steamboat Inspection Service, for the district of Cleveland, Ohio, for the term of five years from the date of issue of this license, to operate or navigate vessels—." But I weary you and myself. The first I don't mind so much but the second I object to, so I refuse to transcribe the rest.

It ends: "Given under our hands this first day of July, 1929," and is signed by Captain Gould, Local Inspector of Hulls, and by Captain Hunter, Local Inspector of Boilers. There's a hull on this duck, and Captain Gould may inspect that. But I'm going to have a hard time providing Captain Hunter with the boiler that, evidently, is his due. Captain, you must bring your own boiler, or go away disappointed. Grover Loening forgot to put a boiler in the thing. I don't know how he came to overlook it, but overlook it he did. Perhaps he was tired, or perhaps he didn't like boilers. Perchance he was born with a natural antipathy to boilers. I'm only guessing, of course. But I've looked this amphibion all over, and nary a boiler do I find. I'm just short one boiler, that's all, Captain. I hope you forgive me; it really isn't my fault.

Personally, I'd have liked a boiler—I really would. If there's one thing I've always admired—and I've said so, dozens of times—it's a real nice boiler. Preferably a rusty one. I just dote on rusty boilers. I don't object to a new shiny one, mind you! But I prefer them rusty. But we all must deprive ourselves of some thing we passionately desire; and the thing I must deprive myself of is a boiler. I'll never forgive Loening for that—no, sir, not to the longest day I live.

You may wonder why I need a license from the hull and boiler inspector. Well, it's like this: When the duck is on the water it is no longer an amphibion—it's a motor boat. The Congress of the United States says so, and it never errs. And if it does it refuses to admit it. And in order to shove this duck around on the water, as a motor boat, I must be licensed as a motor boat operator, and have my boiler examined. Also my hull.

And the examination I had to take in order to get this license! I had to know how many toots I must toot on the whistle in order to let a passing steamer know whether I am going to port or to starboard or to the A. & P. store. The fact that I have no whistle has no bearing on the matter. I must know what to do with it if anyone gives me one. I had a whistle when I was a little boy, and lost it. I shouldn't have been so careless, I can see that now. I wonder what I did with that whistle. I recall it had a white cord on it and it hung around my neck. Now, *what* did I do with it? Did I lose it? Or did some little girl talk me out of it? That, I suspect, from what I have observed of myself in later years, is what must have happened. Some girl got my whistle. It's gone, anyhow. Dear, dear!

And do you think I could fly this duck if I didn't know what lights were carried by a tug when it is towing a raft?

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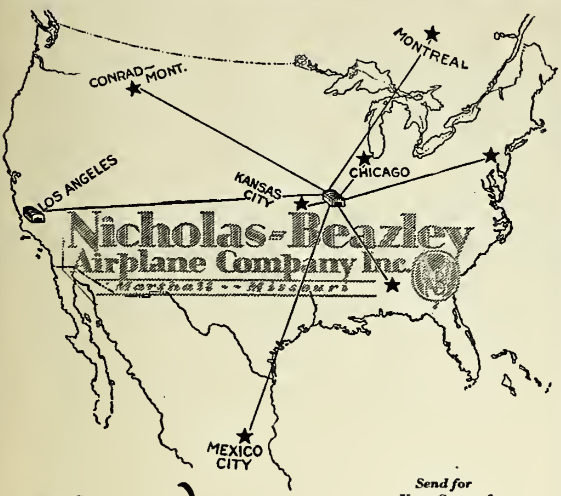

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(*Continued from preceding page*)

I should say not! And what would happen to my passengers if I misconstrued Rule 26 of the "Pilot Rules for the Great Lakes and their Connecting and Tributary Waters?" I shudder to think of it! Listen to 26: "If the pilot of a steam vessel to which a passing signal is sounded deems it unsafe to accept and assent to said signal, he shall not sound a cross signal—" (he isn't to get mad about it, you see) "—but in that case, and in every case where the pilot of one steamer fails to understand the course or intention of an approaching steamer, whether from signals being given or answered erroneously, or from other causes, the pilot of such steamer so receiving the first passing signal, or the pilot so in doubt, shall sound several short and rapid blasts of the whistle; and if the vessels shall have approached within half a mile of each other both shall reduce their speed to bare steerageway, and, if necessary, stop and reverse." There you are—that's that! As I understand Rule 26, if I pass a steamer I am not to get cross, but am to sound several short and rapid, but not angry, blasts on my whistle, which I have lost; and if I'm in doubt I'm to reduce speed to bare steerageway, and stop, and reverse. Stopping and reversing this amphibion in the air is something I must practice diligently. You see, it's no simple trick flying on the Great Lakes. I've heard of pupils stopping and reversing their airplanes in the air, and coming down on their tails, but this is the first time I've learned that I must do it with passengers. You six readers *must* go with me when I try it. I insist. I won't take "no" for an answer. I bet we have a lot of fun together.

Oh yes! I was forgetting the rules about fog. "A steamer with a raft in tow shall sound at intervals of not more than one minute a screeching or Modoc whistle for from three to five seconds." I have never even heard a Modoc whistle; in fact, I didn't know that he could whistle, or wanted to whistle. But apparently he does. So it appears I must carry a Modoc to whistle at the fog, apparently to disperse the fog. I hope he can do it. It will be the first useful thing a Modoc, or Modock, has done for aviation. Noble fellow!—and to think I've been kidding Modocks all my life. I shouldn't have done it.

There are many more rules—I learned them all in order to pass the examination, and fortunately have forgotten them since—but I'll not bore you with them, for I'm too tired to write them all down. "So may the divil fly away wid all rules—an' bad cess to thim," as my grandfather, an Irish minister, used to remark in off moments, and he was usually off, the dear old rapscallion—and I take after him, I do that, may his sowl rist in pace! But I must keep pounding this confounded Corona—and may it rust in perdition when I'm through with it!—until I've told you what a trip across Lake Erie is like.

Perhaps you haven't flown across water. If you haven't, I advise you to do so—look what a flight over water did for Lindbergh! Which reminds me; a young lady passenger said to me after we landed, "Oh, I felt just like Lindbergh when we were out of sight of land."

"Did you?" I said. "Indeed! Well, to make you feel even better I'll mention that if the motor had stopped out there you'd have felt highly delighted to think you were with me on Lake Erie instead of with Lindbergh on the Atlantic,—our reputations to the contrary notwithstanding!" I was referring, of course, to the different floatation values of an amphibion and a land plane. Incidentally, and in passing, I pause to record the significant fact that no transocean pilot has ever *again* made the flight directly to Paris. Figure *that* out on your mandolin!

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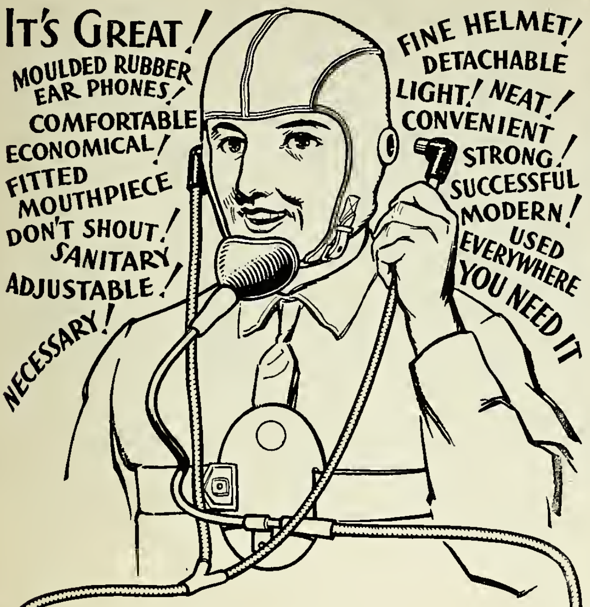
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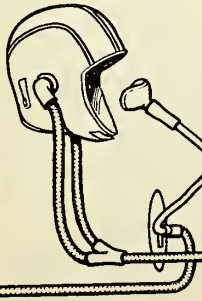

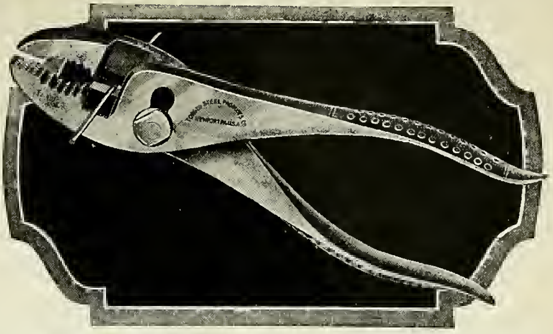

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(*Continued from preceding page*)

On clear days we fly from Cleveland straight across Lake Erie, on a compass bearing of 310 degrees, and hit the Canadian shore above Point Pelee, fly across Ontario, and land in the Detroit River. On thick days we hug the shore about to Vermilion, Ohio, cut across to Kelley's Island, turn north to Pelee Island, and strike the Canadian shore about Kingsville. Sometimes we go right along the Ontario shore to the Detroit River, and go up that. On especially thick days, when the weather is what we call pea-soup, we hug the American shore all the way, going right to the end of the lake and passing Toledo, where we turn north. Only on two days have we had to do that, however. Also, on those days when we skirted the lake, no airplane was able to fly in our neighborhood at all. The old ducks sneaked along the shore and got through. Mark one up for the duck!

This is historic ground, this old Lake Erie. If the weather is thick enough to make us sneak through by the islands, we pass South Bass, with Put-in-Bay harbor, from which Captain Oliver Hazard Perry departed on the 10th of September, 1813, to administer a crushing and unexpected defeat to the British naval forces on the lakes. Perry fought for liberty on the same lake where the Coastguard now fight for the prohibitionists. Poor old Perry! I'd hate for him to come back and see how his lake has changed. Even the name is different. Up around Detroit they call it Lake Beerie.

Which reminds me: the flight from Cleveland to Detroit sometimes gives you the privilege of watching the blockade runners loading their boats at Amherstburg, Ontario, for their dash to relieve the parched throats of Americans in Detroit. I've seen those boats dozens of times, with their burlap-wrapped packages, loading up in daylight—and quite legally you understand, according to the Canadian export laws—for their night run across the river or the lake. Often the boys in the boats, perhaps recognizing a kindred spirit, wave up at me. And I wave back with kindliness and encouragement simply shooting out of my hand. I've grown to think that they like me, for they never fail to wave, and, as I usually fly low, they must recognize me. I certainly recognize them. There's one fellow, who oddly resembles a gorilla, for whom I have an especial affection. He looks like such a tough, hard-boiled egg that I know we would get along all right if we ever met. Some day, probably on a Sunday, when I have a lay-over in Detroit, I am going to motor to Amherstburg and meet that bird. And I'm going to say to him that I'm the bird who flies over him every day or so, and looks down at him. And that tough egg, if he has the heart of a man and a brother, is going to say to me, "Come in the warehouse and see what you think of this."

A LAYMAN'S FLYING LOG

(*Continued from page 72*)

Sept. 6 to 30, 1922. Up several times with Clif Olson, Fred Wallace, Fred Carlson, Frank Wallace, pilots, learning to hold her nose level and keep her from skidding. Clif showed me how she would spin if I stalled her. We came out of it.

Over Washington with Streett

Nov. 30, 1922. Bolling Field, Washington, D. C. "Glad to take you up myself," said Captain St. Clair Streett, in charge of operations at Bolling. From his DH 4 looked down at Monument, Capitol; realized beauty of L'Enfant's

(*Continued on next page*)

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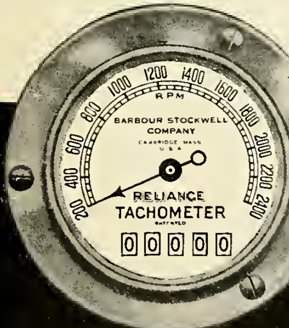

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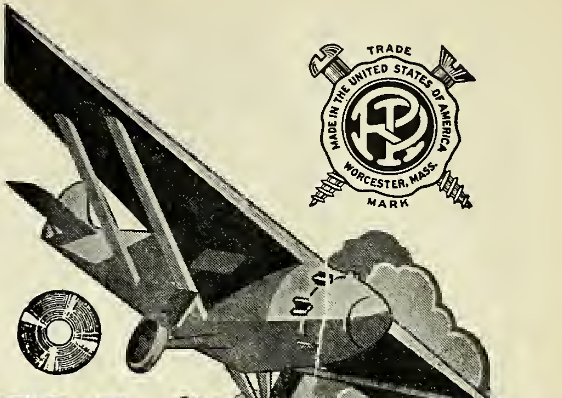

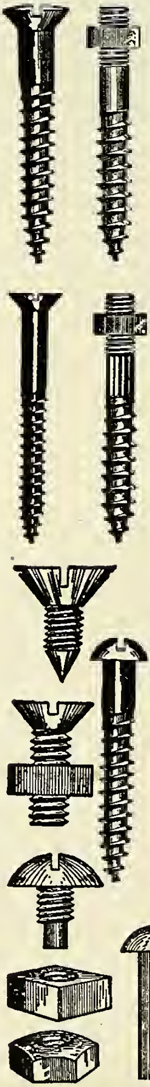

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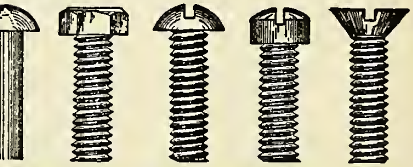

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(*Continued from preceding page*)

plan of Capital City as never before. Pilot did some steep banks to give me unobstructed view of scenes of special interest, but I should worry, with Bill Streett at the controls!

July 10, 1923. To Minneapolis in Army DH 4 with Martinus Stenseth, ace and pilot, for dedication of Speedway as Wold-Chamberlin Field. En route, pilot checked course by gliding down over railroad and reading name of town as we flew over station; new idea then to this passenger.

Captain Thenault Looks On

July 18, 1923. Hop off Wallace Field in MO-1, Lieut. Pond of Navy, pilot. MO-1 on test flights. Pond's distinguished passenger in and out of Davenport was Captain Georges Thenault, former commander of Lafayette Escadrille, now air attache at French embassy. Met them at Minneapolis last week. Made friendly call at Davenport on way back to Washington.

To Lambert Field in a Blimp

Oct. 3, 1923. Hurrah! Been up in a blimp! Had three hours in the TC 3, off Scott Field at Bellevue, to St. Louis Pulitzer meet and return. Flagship of our fleet of two was the RN-1, Major (now Colonel) John Paegelow in command. Since he was delayed in taking off, we cruised around, inasmuch as it would not do to precede the flagship. Tied down on Lambert Field for hour. So did the *Shenandoah* during the meet, making our blimps seem like ponies. Saw Al Williams do 242 miles per hour to win Pulitzer race.

Up with Williams

June 17, 1924. Up with Lieut. Al Williams in a Vought, of Anacostia Field, Washington, D. C. "Your heart all right?" he asked. "Yeah!" So I drew two loops, an Immelmann, a barrel roll, a 1,500-foot side slip, a roll and a loop, a tail spin, roll and a half, and slip landing. Liked the tail spin best, and the side slip. Carl Schory told me what the others were after we landed. "Thanks for the ride, Lieutenant!" "Don't mention it; if all the editors were doing what you are, our troubles would be all over."

Over the Alleghenies

June 30, 1924. Enjoyed first flight over Alleghenies, on way from Democratic National Convention at New York to N. A. A. governors' meeting at Dayton; Lieut. G. H. Burgess, pilot. Lunch at Moundsville. Off for Dayton. Showers in front. Flew around and between them. Over my birthplace, Zanesville, Ohio. Stopped to say Hello at Norton Field, Columbus. Landed McCook Field, Dayton.

Home with Harold Harris

July 2, 1924. Dayton to Davenport in Lieut. Harold R. Harris' streamlined DH 4, in which he had made several world records. Compliment appreciated when Harris said, "I've decided to fly you home myself." Off at 9, across part of Ohio, all of Indiana and Illinois at 125 miles an hour. Pilot's sense of direction confirmed when we hit Wallace Field right on nose. Harris did a circle over my home and up-looking family, with whom we were soon at lunch; and he then off for McCook, to land in mid-afternoon.

Chased by a Bulldog

Aug. 19, 1924. Visibility bad, as Lieutenant Martinus Stenseth flew me, Davenport to Fort Des Moines, so low

(*Continued on next page*)

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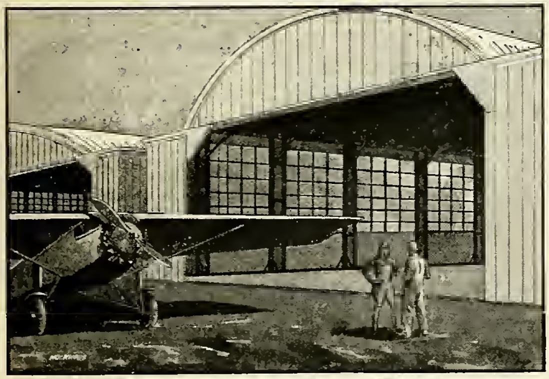

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(Continued from preceding page)

that farmer's bulldog chased us at one time, but with his short legs couldn't make our pace. Rivers over banks, saw much flood devastation. Interviewed Colonel Halstead Dorey, commanding Citizens' Military Training Camp, at the Fort.

"This Is the Life"

Oct. 12, 1924. "This is the life!" On a sheet from my note book, I just had to write it and pass it back to Captain Ed C. Black, as he flew me over the mountains, McCook to Bolling Field, after the Dayton Pulitzer race. From front cockpit of a Martin bomber, out of air stream, had full view of Alleghenies, their foliage touched by frost that turned it into 20-mile-wide strip of carpet beneath us, of all the colors of the rainbow. Flying down the valley of the Potomac to Washington, I wondered whether the Monument or the Capitol would first break the skyline. Instead, saw a white oblong from 20 miles away—the western face of the Lincoln Memorial throwing back the rays of the afternoon sun!

My Greatest Compliment

Oct. 16, 1924. Back over Airways to Dayton and Detroit, in DH 4 piloted by Lieut. W. T. Atkinson of Langley. Received my greatest compliment during stop for lunch at Cumberland, from Air Corps sergeant who approached with a snappy salute and inquired, "Is there anything we can do for you, GENERAL, while you are here?" . . . Took two runs to get off small field at Cumberland. Only time I knew a Liberty engine to be under par. Night at Bachelor Officers' Club at Wilbur Wright Field at Fairfield, Ohio.

An Early Landing on Ford Airport

Oct. 17, 1924. Phoned W. B. Stout we would land on Ford Airport at 11. Landed at 11:01, Atkinson the first Army pilot, Stout said, to land on the field. Inducted by Ralph Upson, later in the day, into the mysteries of all-metal airship construction.

April 19, 1925. Hopped from Moline Field with Gus De Scheppers, pilot, in the still-surviving Jennie.

June 1, 1925. To Chanute Field, Rantoul, Ill., in Travel Air, Lieut. Earl K. (Rusty) Campbell, pilot, with Jack Cope, parachute jumper, as companion passenger. First leg of roundabout trip, Davenport to Washington, D. C.

June 2, 1925. Connected with Airways plane at Chanute, bound southwest to Scott Field. Fine ride thither with Lieut. W. L. Scott, pilot, in DH 4.

Fast Travel to Washington

June 3, 1925. Off from Scott Field at 8:30 for Bolling. Courtesy stop at Louisville, Ky., lunch at McCook, where Lieut. Louis Meister said, "Hello; you're getting to be one of our regular customers." After wait of an hour after lunch for photographic plates which Louis wanted to send to Bolling, we were off at 2. Tail wind still helping us, landed at Washington at 5:04.

June 5, 1925. To Mitchel Field from Bolling in Navy DH, Aviation Pilot Williamson at the stick, for conference with Aero Digest folks. Back to Bolling next day in same plane. Williamson evidently a competent though non-commissioned pilot.

Sept. 3, 1925. Always wanted to ride with Eddie Stinson. First chance today, when he came to Moline Field with National Air Tour pathfinding plane, a Junkers. "Get a little party together, and I'll take them up," said Eddie. I did, Ralph, Jr. was one of the group.

(Continued on next page)

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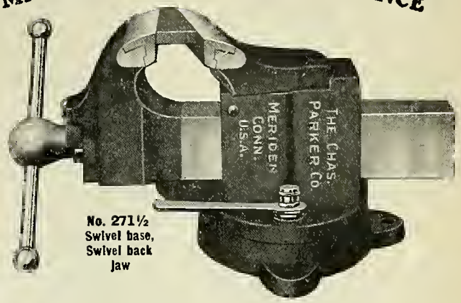

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(*Continued from preceding page*)

Oct. 12, 1925. At New York Pulitzer meet, had sky ride with Anthony Fokker, in tri-motor job, Fokker leaving the controls to visit with passengers while plane flew itself.

Oct. 14, 1925. False start, homeward bound, from Mitchel Field with Lieut. James L. Grisham, in Martin Bomber, pointed toward Bolling on way to Dayton after New York air races. Head winds and storms held us over New Jersey until we turned about and returned to Mitchel, in jig time.

Oct. 15, 1925. Tried for Bolling again with Grisham, made it but found 50 or 60 planes grounded there by thick weather over the mountains to the west.

Storm Drives Us to Mountain Field

Oct. 16, 1925. Major Claggett at Bolling released ground order, and about a hundred pilots and mechanics started for planes with a whoop. Soon ran into soup over the mountains. Grisham held her nose into the storm until it looked hopeless, then swung about and landed on "Smiling Joe" Humberston's emergency field, lying right up against the National Pike. Our run as we landed carried us right to the fence along the Pike. "The 36th plane we've counted in two hours," said the crowd of the curious that quickly gathered. Lieut. Clifford Nutt's DH followed us partway down to check our landing and then went on into the storm, as did Lieut. G. H. Burgess, my 1924 cross-mountain pilot. Burgess, alas! crashed 12 miles farther on, and they named for him the Uniontown field, near which he fell.

July 12, 1926. Off Davenport's new airport, with "Cactus" Brierly in the new Super-Swallow—a ship on its way for delivery in the East.

Raced Tour Planes with Vance Breese

Aug. 12, 1926. Met National Air Tour planes at Des Moines, for four flights, to Lincoln, Wichita, Kansas City and Moline. Did the Lincoln-Wichita hop in Ryan monoplane, with Vance Breese, pilot. Started last and passed 20 out of 25 planes on way to Wichita. Other hops were in Douglas transport, piloted by Lieut. Elliott of Selfridge. Into Kansas City after half-hour above the clouds, out of there next day in driving rainstorm. Shut in by walls of water for 20 minutes. Hit one hole in the air that Elliott estimated let us down 400 feet, but we had altitude to spare. Out soon under clouds into fair visibility. My little grandson, in crowd waiting at Moline, got a big kick out of sitting in the plane that had brought "Bompa" home.

Meet the "Los Angeles" in the Air

Sept. 1, 1926. Captain Donald Wilson, pilot of the DO 2, Bolling to Mitchel, pointed ahead, where a little streak on the horizon developed into the pride of the Navy, the dirigible *Los Angeles*. Flying alongside her, a hundred yards away, we waved greeting to crew and passengers for several miles. With a parting wingover, Captain Wilson swung away, over the beach towns, with the broad Atlantic on our right, up the coast to Long Island. A real thrill. Respects to Colonel (now General) Foulois, and then in his car to Roosevelt Field, to see Fonck's beautiful Sikorsky plane, which crashed and burned a fortnight later.

Sept. 12, 1926. Up above clouds from Moline airport with Gus De Scheppers, pilot, in his Waco.

Nov. 10, 1926. Up with Lott, N. A. T. chief pilot at the time, in tri-motor Ford, during stop at Moline.

April 7, 1927. Tried out new cabin Travel Air with "Rusty" Campbell, manager Moline Field, who had just brought it from Wichita.

(*Continued on next page*)

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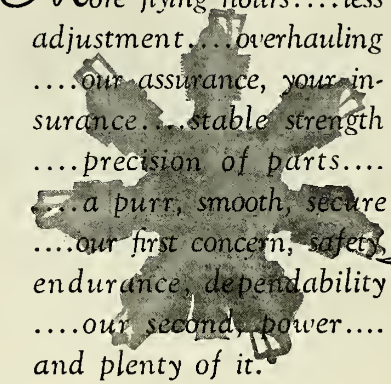

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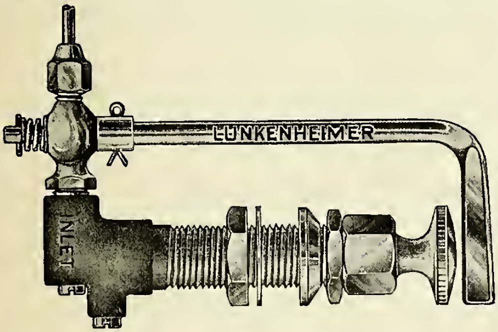

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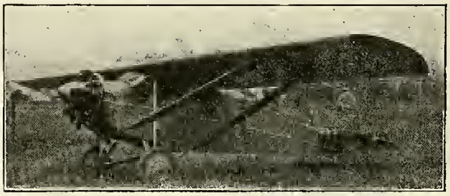

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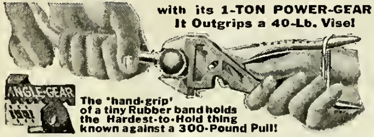

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(Say "Eye-fel—Flash") "The T.N.T. of Tools"

You get the amazingly Quicker, Better, Easier, Universal Tool Service of Nos. 1, 2 & 3—Convertible in 1/5 second—in this new 24-Ounce Master Tool Kit—for the Price of One Good Tool; yet it Does the Work of the best other tools Weighing 60 pounds and Costing $50.00!

Hundreds of Thousands of Men and Women are using these wonder Kits to make Homes and Estates more comfortable—Farms, Shops, etc., more profitable; to get more and better service from Auto's and all mechanical devices with a huge saving in money, time and energy!

Used by the U. S. Army and Navy. Just try a PlieRench Kit Once, and you'd no more go back to other tools than to the ancient Ox-cart!

With each Kit a 64-page Manual of Mechanics

A GUARANTEED SUPER-QUALITY PRODUCT (c) '29 J.E.)

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"You can't imagine my pleasure on seeing your ad. in Air Trails Magazine today, until you read my story. A short time ago I left my PlieRench Kit at an Ohio Flying Field in an airplane on which I worked and which I never met with again. I was rather broken-hearted because I had used my PlieRench for five years and it was by far the most Powerful and useful tool I have ever owned round my airplane and my automobile.

"In trouble on the road and on my flying trips it sufficed for a vise, adjustable wrench, pliers, wire tool, etc., and in any situation I encountered which ordinarily required tools found only in a shop.

"Without my PlieRench I lost confidence in my ability to make repairs, etc., when forced down in rural districts. I tried to get another PlieRench KIT in stores in many cities, but without success; and now you will understand why I was so happy about seeing your Ad. today. I would enclose a check for a KIT, but forgot what I paid for my old one, so send it C. O. D., and rush."
(W. J. J., Buffalo, N. Y.)

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for PlieRench Factory Representatives — Full or Part Time. Amazing Demonstr'n sells at sight—makes $75-$200 weekly all year 'round. Seasonal Demand Doubles Profits. A Ga. Repr. made $97 in 20-Min Group Sale; a Mich. Repr. $368 in 12 days; another $379 in 5 days. Everybody wants the Kit!

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ARE WITH COMMANDER BYRD AS HE CLAIMS NEW TERRITORY FOR THE U.S.A.

Probably no flyer has experienced more rigorous flying conditions than those being met by Commander Byrd in the Antarctic. The fact that he is using Aerotogs is the greatest recommendation for their warmth, usefulness, and durability.

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GORDON & FERGUSON, INC.
ST. PAUL, MINN.

Commander RICHARD E. BYRD in Gordon Aerotogs.
Natural, unplucked Alaska Seal flying suit.

(*Continued from preceding page*)

May 7, 1927. Found out how beautiful Chicago is from the air—under the right conditions. With "Rusty" Campbell and four other passengers on regular Saturday Moline-Chicago trip, in Travel Air cabin plane. "Want to fly over the city?" inquired "Rusty," when Checkerboard Field was in sight. Unanimous, "Yes!" So we climbed a mile, and crossed the city to the lake front. Wind off lake, air clear, morning sunshine illuminated all the familiar hotels and skyscrapers, we looked down from reserved seat in the sky and saw Chicago as only the air travelers see it. Called on Prof. H. J. Cox, veteran forecaster, after landing, in connection with the fine meteorological service he is glad to extend to fliers. A. M. Hamrick, one of our passengers, is meteorologist at Davenport, and in charge of weather service from Moline airport. Back to Davenport, with favorable wind, 160 miles in one hour and fifteen minutes.

June 26, 1927. Cloyd Clevenger jazzed me in his special Air Tour Whirlwind Eaglerock, over Ford Airport, Dearborn, Mich. Said afterward if he had known I wasn't an old man, he'd have shown me some REAL stuff.

Same afternoon.—Up with Randy Page for two hops in the new all-metal Hamilton plane. Tom's ship flew fine, with its cabin built way up into the full cantilever wings.

Over the Land with the Navy

July 27, 1927. Off on Third National Air Tour in Navy tri-motor Ford, Commander A. C. Miles and Lieut. H. R. Bowes, pilots. Among my distinguished fellow-passengers were Dr. Edward P. Warner and Wm. P. MacCracken, Jr., assistant secretaries for aeronautics departments respectively of the Navy and Commerce. Saw Canada beneath us all along the north side of Lake Erie to Buffalo. Next day Navy plane tore out a tail skid landing on small field at Geneva. But if anyone thought Miles and Bowes couldn't fly that plane they changed their minds after our beautiful landing at Detroit a fortnight later, in rain, wind and lightning. That was after we had flown east to Boston, southwest to Dallas, north to Omaha and back east to Detroit. On an Air Tour, with everyone wanting to ride, the wise passenger stays where he is put. So I stuck to the two big Fords, the other Ford company entry piloted by Dean Burford. A gr-r-r-and trip.

Aug. 28, 1928. Used the air route from Davenport to Moline, in a Monocoupe with Pilot Douglas Harris.

"The Battle of the Carrots"

Same day, to Mason City, Ia., in trimotor Fokker as guest of Assistant Secretary of War Hanford MacNider. Pilot Captain R. G. Ervin shared the stick with Colonel MacNider. Mrs. MacNider was a fellow passenger, and at Cedar Rapids we landed to take on Colonel C. B. Robbins (afterward MacNider's successor as Assistant Secretary of War), and Verne Marshall, editor Cedar Rapids *Gazette*. Verne sick soon afterward. I should never have told, but as soon as he was back at work he printed the sad story in full, and advised everyone not to eat carrots before taking an airplane ride. "I get sick even on the train," he added. Only experience this writer ever had with anyone being sick in a plane.

Lindbergh at Play

Next day, dedication of Mason City Airport, Major Lanphier there from Selfridge with squadron of pursuit planes. Lanphier and Woodring flew to Sioux City to escort Colonel Charles A. Lindbergh back to Mason City. It was playday for Lindbergh, a Sunday off from his 48-state air tour, and he was out in the MacNider power boat

(*Continued on next page*)

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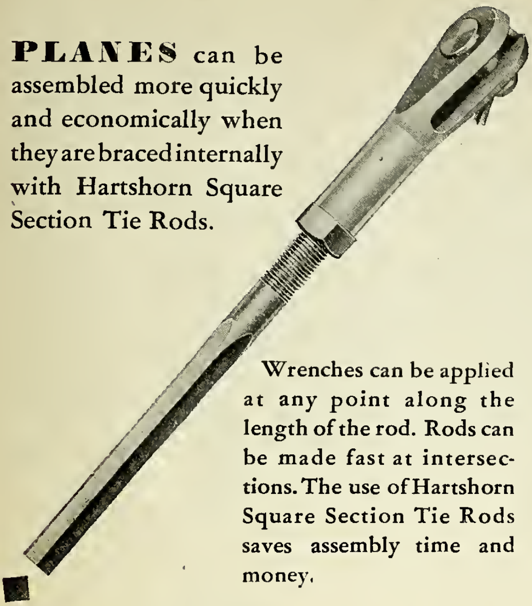

Wrenches can be applied at any point along the length of the rod. Rods can be made fast at intersections. The use of Hartshorn Square Section Tie Rods saves assembly time and money.

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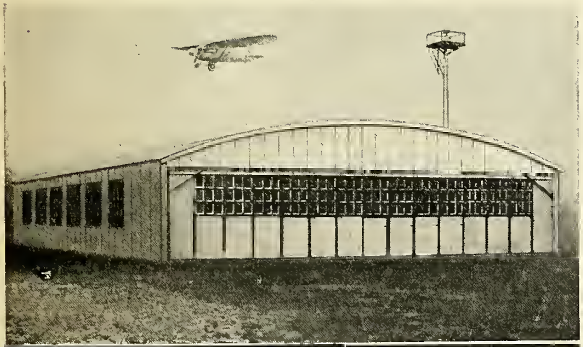

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THE 7-cylinder *Le-Blond "90"* is the same great engine as the 5-cylinder *Le-Blond "60"* - - the first and only aircraft engine in its class thus far to pass the rigid United States Navy test - - except that two cylinders have been added to obtain increased power. Both engines are unparalleled for performance in their respective hp. ratings. 90% interchangeability of parts.

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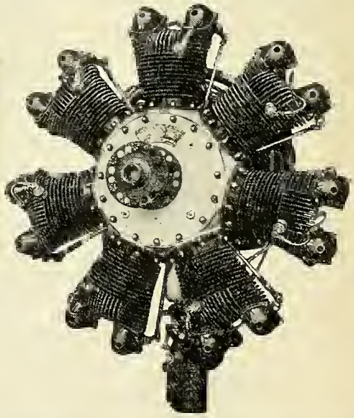

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Tailored to fit snugly and comfortably—no wind can penetrate "The Empire" Helmet.

Every Empire Helmet is guaranteed to give satisfaction. Established in 1907, our 22 years of experience in cap manufacturing is behind "The Empire" Helmet.

PRICES

Genuine Calf Leather Helmet (Black or Brown)

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Durable Cloth Helmets (for Summer Flying)

White or Tan Herringbone Cloth.....$1.25
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The above helmets sold unlined with taped seams at 25c less than list price.

Specify size desired.
Postage Prepaid

Special discount to dealers and distributors or flying schools.

Empire Cap Mfg. Company
908 Broadway, Kansas City, Mo.

(*Continued from preceding page*)

on Clear Lake in the afternoon. Surf riding behind the speedy boat looked more thrilling than flying.

A Quick Trip to Detroit

April 16, 1928. Off this morning in Travel Air cabin plane for Detroit aircraft show, R. T. (Stub) Quinby, pilot. In accompanying Fairchild were W. L. Velie, Sr., and Will Velie, Jr., recently graduated from auto to airplane manufacture. A fellow passenger of mine was Mrs. D. H. Sundell of Davenport—charming and air minded, as the sequel will show. Had 27 hours in Detroit, left for home in same plane Tuesday noon, back in the Democrat office in Davenport by 4:30 p. m.

By a sad coincidence, both the Velies died unexpectedly but from natural causes within a year, this tragic note offset by the happier one that, within the same period, made Mrs. Sundell the bride of Jack Harding, the "Smiling Jack" of the Around-the-World Cruise.

June 6, 1928. Regular passenger on mail plane, Travel Air, L. I. (Pete) Lewis, pilot, to Kansas City, to attend National Republican convention. Saw President Hoover nominated.

July 3, 1928. After seeing Governor Smith nominated for president by the Democrats, was able to carry out a long cherished wish to visit Kelly and Brooks Fields, while waiting several days for the National Air Tour planes, soon due at San Antonio. So I was soon flying, Houston to San Antonio, in General F. P. Lahm's special Falcon, Lieut. Harvey Ogden, the General's aide, pilot. Over clouds at 7,000 feet found delightful contrast to intense ground heat.

Way Up, It Seemed to Me

July 6, 1928. Up off Kelly Field for 15,000 feet with Lieut. Ogden in same Falcon—four times as high as scattered clouds, between which we looked down on San Antonio, and askance at towns 40 or 50 miles away. Glided down and flew around borders of 2,550-acre field on opposite side of San Antonio to be new site of flying training center. Landed Fort Sam Houston and Winburn Field. Great stuff!

July 7, 1928. Welcomed planes of National Air Tour at Winburn Field, after enjoying hospitality of Bachelor Officers' Club at Kelly for several days.

July 9, 1928. Off from Winburn with Tour in Buhl Airster, Alger Grahm, pilot, Tour Manager Ray Cooper helping me fill front cockpit. Noon stop at Marfa, night El Paso.

July 10 to 28, 1928. Became permanent passenger for rest of Tour with newspaper men, weather shark, official scorer and others in Army transport (Fokker trimotor) piloted by Lieut. Frank B. Tyndall. Over deserts and cow country to El Paso, Tucson and Yuma, over mountains to San Diego, up coast to Los Angeles, San Francisco, Portland and Tacoma, over clouds and mountains to Missoula, across the northern wheat fields to Great Falls, Minot, Fargo and St. Paul, and familiar country to Detroit. A 6,500-mile trip, the fourth Air Tour, and not a person scratched or ship washed out, on all four!

Fall of 1928. Off Moline Field in Stanolind, Dan Lamont, pilot. Off Davenport field in Stinson-Detroiter, G. W. Steward, pilot. Off same field with Dan Hunter in new Stinson, Jr.

Nov. 11, 1928. A whoopee ride with Lieut. Bob Minick in American Eagle, before dedication of Davenport airport, which my townsmen were kind enough to name Cram Field.

Steady, Silent Durable

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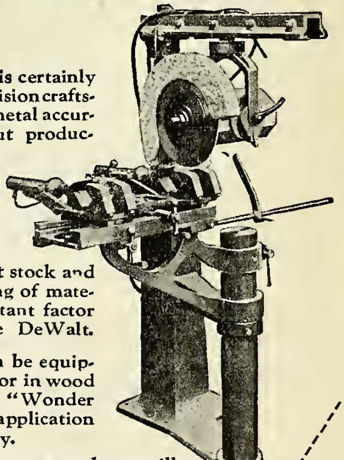

The same machine can be equipped for cutting wood, for in wood cutting the DeWalt "Wonder Worker" has a special application to the airplane industry.

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Tell me how the DeWalt cuts cost.
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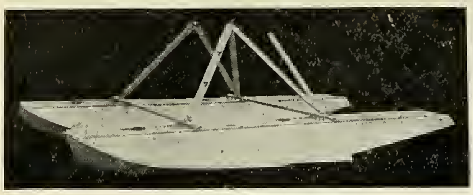

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30% Increased angle of vision in all directions.

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PITCAIRN AIRCRAFT, Inc.
Bryn Athyn Penna.

THE PASSING OF PIONEER DAYS

(*Continued from page 77*)

To fly alone over an ocean of black fog at night, with no idea where he was, no communication—nothing but a couple of flares and a parachute—was not exactly like attending afternoon tea.

A flier in the old days was in life, clear up to the hilt. I remember when some fellow in the Army discovered what caused a tail spin, and how to stop it. Many men had died in tail spins. The action of a plane in a spin was mysterious, like the disappearance of ships on the sea in the times of the explorers. Some uncanny power seemed to take the machine out of the pilot's control. Now, there are some types of plane that you cannot make spin, and there is no commercial plane that will spin voluntarily.

Well, the Forty-niners and the cowboys had their day, and it looks like we air vets have about had ours. It must make an old cowman mad to see a fellow in shiny boots and polo pants riding a slick horse. Well, it hurts, in a way, to see these Boeing pilots climbing up into heated cabins, wearing business suits and straw hats, and talking to somebody over the 'phone all the way over the run. Next there will be a demand for telephones in the passenger cabins too, so the travelers can call up their offices, for this can be done today with our radiophone system now being completed by the Boeing System between San Francisco Bay and Chicago.

Well, you might say they are making flying safe for everybody, which is what the country wanted. A few people want thrills, but they want safe thrills. Some don't want any thrills at all, they want to go places in a hurry. I am glad that the new flying era is here.

AIR PATROL OF THE COAST GUARD

(*Continued from page 58*)

and throttle down so they could watch three speed boats try to draw the patrol boats away from a rum ship. The first act of this little comedy showed the decoy speed boat come up on the horizon from seaward as though it intended to come inshore. By passing off at a little distance, but well in sight of the patrol boats, he naturally gave them the impression that he was trying to conceal the fact that he had a cargo of liquor and hoped to make a run with it. One of the patrol boats at once gave chase. The speed boat had no cargo, of course, and by opening up its engine only enough to make it interesting, managed to egg the patrol boat into pursuit.

At about this time, a second speed boat came up on the horizon at another angle. This second boat came along fairly near to the boat on patrol and with no big ship in sight to watch, the Government boat gave chase. Men on board a third speed boat, lying by with a full crew at about ten minutes' distance, were watching this scene through high powered binoculars, and when it was evident that both patrol boats were busily engaged with the two decoy speed boats in the other direction, so that the road to the rum ship was clear, rushed madly up to it. Only about five minutes were required to throw the bags of wine and cargo nets, and perhaps ten minutes in all was enough to turn the trick for the enterprising rum runner. The speed boat then turned toward shore, having dumped stores and messages on the "rummy" during the exchange.

While all this was going on, the decoy boats had slowed down, and had permitted the Government patrol to overtake and board them. But all this took time, and precious

(*Continued on next page*)

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Columbus, Ohio **Los Angeles, Cal.**
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Telegram from Loren Mendell & Roland B. Reinhart:

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246 HOURS WITHOUT BEING TOUCHED

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Mitchell & Newcomb, "City of Cleveland" Stinson-Detroiter Whirlwind, 174 hours.

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Lt. Herbert J. Fahey, Lockheed-Whirlwind, 36 hours 56 min. Solo Endurance, Mrs. Phoebe Omlie, Velie-Scarab, 25,800 feet.

Kingsford Smith-Ulm, "Southern Cross" Whirlwinds, America-Australia-England.

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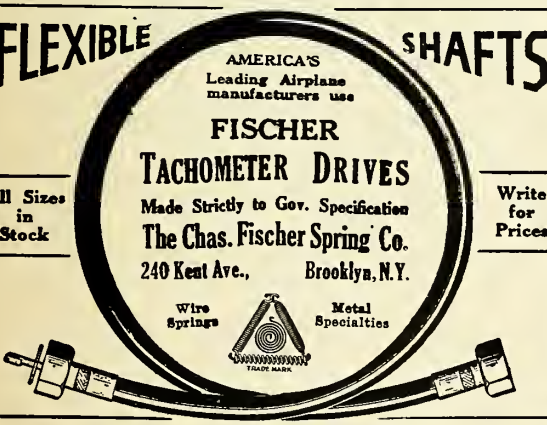

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AERIAL NAVIGATION

Manufactured by
E. S. RITCHIE & SONS
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Manufactured by special arrangement with Henry Hughes & Sons, Ltd., London

(*Continued from preceding page*)

time, too. There was, of course, no contraband on the two decoy boats, and patrol's efforts were wasted.

It was all very interesting to watch, and the captain of the cutter especially enjoyed it as the plane crept up on the speed boats and took in the fine points of this illegal maneuver. Thus was the air patrol able to observe the methods employed by rum runners. All the boats on patrol were warned of this little game, and in time, this was one of the things that broke up the famous "Rum Row."

Several years after the Coast Guard had initiated its aviation service, and inasmuch as it had proved so notable a success, Congress passed legislation providing for ten air stations which were to be maintained in the same way as the original one. Unfortunately, this generous gesture amounted to very little, for the funds to apply to these air stations were conspicuously lacking and have remained lacking ever since.

Enough was granted, however, to do something toward making a start at an aviation unit at Moorhead City, off the coast of Carolina. This section about Cape Hatteras has long been known to mariners as the "Graveyard of the Atlantic," for it has had more of its share of tragic wrecks. This base was gradually forced into the sea by the loss of land, and was later abandoned, though the unit at Base 9, at Cape May, has done splendid work from the hangars owned by the Navy.

The latter is also a very dangerous section. In the spring, it is regularly visited by the Gloucester fishing fleet because of the mackerel found off the Jersey coast at that time. Lieut. Walter Anderson and Chief Gunner Thrunn have shared the patrols there for several years, and have a fine group of enlisted men in their unit to back up their flying. It must always be remembered that it is largely the character of work done by the mechanics that tells the story in aviation. Piloting the plane is only part of the job.

A base was started in southern waters last year, near Ft. Lauderdale. The flying there has become extremely important, since there is so much activity in and near the water with various regattas and outboard motor races. The dramatic rescue of these small speed boats at the regattas is one of the most interesting of the many ways in which the air unit operates on patrol. For example, in one race between Boston and New York, planes followed the entire course of the race. A Senior Officer was in charge of the patrol, and the two planes on duty reported continually to him by wireless, so that he was informed at all times of the progress of the race itself, as well as of the accidents which seem inevitable on such occasions. Five of these speedy little craft capsized on this particular day, and the news was in each case radioed by the flier overhead to the nearest patrol boat on duty. The boat then rushed to the rescue and picked up the men.

Another interesting example of the use of radio from these planes is the immediate report from the pilot who has sighted a school of fish. The radio message is at once relayed from the base to the Master Mariners' Association, where it is turned over to the nearest radio broadcast station, which announces it over the air.

Practically all of the fishing boats at Gloucester are equipped with radio receiving sets, and one or two, with modern transmitters. Thus the news of the school is immediately available to the fleet, and according to Lieutenant Melka, the first boats often set out toward the location reported within fifteen or twenty minutes of the time the news is radioed to the base.

The Coast Guard flying usually must be carried on at

(*Continued on next page*)

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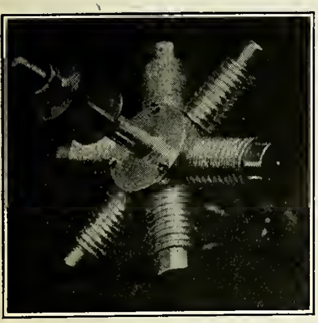

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(Continued from preceding page)

a low altitude. Generally speaking, the patrol is flown at an altitude of 750 or 500 feet. The occupants of the plane wear no parachutes, since of course their route is over water. There is, however, a kapok pillow that if needed is supposed to act as a sort of life preserver. In addition, as in Navy planes, there are extra supplies, including chocolate and malted milk tablets, hard tack, bait, fishing lines and fish hooks, coston signals (green and red), canteens of water, and spare parts for the plane in small kits, etc.

With the tremendous increase of air traffic in America, there will soon be greater use of the coast-wise air routes. Hand in hand with this need, the Coast Guard plans an expansion that shall stand ready to serve these aerial travelers.

Within the past few months, a new system of protection for coast-wise air traffic has been devised by Lieut. Commander Norman Hall, in charge of the Aviation Unit of the Coast Guard. This is now in active service. All planes flying past Coast Guard stations are carefully checked from one to the other, after notification is received from the airport that the plane has taken off. Planes so reported that fail to turn up within a reasonable length of time are reported to the authorities selected by the airport, or the owners of the plane. If the plane is two hours overdue, a search is started immediately under the direction of the District Commander. In this way, aid is almost immediately available to the pilot in distress; he is not left for days untended if forced down on a lonely shore far from aid.

The U. S. Coast Guard has been fortunate in having brought together a small and hardy group of what are probably the most enthusiastic fliers in the world. They seem to thrive on an indifference that would have stifled any other service, for when millions were appropriated by Congress for other purposes, these men had to cling like a barnacle to their old and outworn planes. They seemed to have enjoyed flying under conditions that ordinarily would bring back the average pilot to the safety of his hangar. Fog, snow and sleet are all part of the day's work, just as they are to the air mail pilot.

The prestige of the life-saving unit of the nation has been greatly enhanced by this band of some five or six pilots and their loyal group of motor machinists who service the planes. But it is work that has been done simply, quietly and without ostentation. It is only the men who go down to the sea in ships, who have been caught in small boats in storms who can truly tell the story of the Aviation Unit of the Coast Guard.

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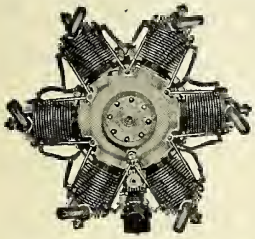

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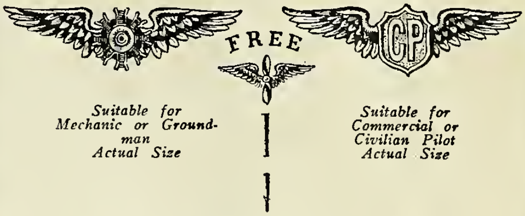
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